

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

CASE NO. 2:20-cv-12008-LVP-EAS

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
COMPANY; ALLSTATE PROPERTY
AND CASUALTY INSURANCE COMPANY;
ESURANCE INSURANCE COMPANY; and
ESURANCE PROPERTY AND CASUALTY
INSURANCE COMPANY.

HON. TERRANCE G. BERG

Plaintiffs,

V.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST NEUROLOGY, PC.;
PERFORMANCE ORTHOPEDICS OF MICHIGAN PLLC;
BRR MEDICAL SUPPLY, INC.; GULF COAST
MEDICAL SERVICES, LLC; CCT MEDICAL SUPPLIES, INC;
STEFAN PRIBIL, M.D.; WESLEY BLAKE BARBER;
TESSY JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

**DEFENDANTS, TESSY JENKINS AND NORTHWEST NEUROLOGY'S
ANSWER TO PLAINTIFF'S MOTION TO COMPEL AND FOR COSTS AND
SANCTIONS AGAINST NORTHWEST NEUROLOGY AND TESSY JENKINS**

NOW COME DEFENDANTS, NORTHWEST NEUROLOGY AND TESSY JENKINS,
MD, by and through their attorney, Paschal Ukpabi (Law Arena, PLLC) and in answer to
Plaintiffs' Motion to Compel, and for Costs and Sanctions against Northwest Neurology
and Tessy Jenkins, state as follows:

I. INTRODUCTION:

Plaintiffs move this court to compel discovery from defendants, Northwest Neurology and Tessy Jenkins, MD, and also ask for costs and sanctions against defendant. Plaintiffs also assert that Defendants violated this Court's Order.

Plaintiffs' motive for filing this motion is suspect. This is in spite of the communications between the parties that a little more leeway should be accorded parties considering that these times are not normal times, and that most of the employees are not readily available; ditto the accountant, billers, and other officers of Northwest Neurology. Furthermore, some of the documents sought are not available because defendants provided limited services to defendant IsPine, and are not in a position to answer some of the interrogatories beyond what has been submitted.

Besides, the Plaintiffs request that Defendants be compelled to file responses includes a request for costs and sanctions. Such reliefs are usually appropriate if a party has deliberately failed to produce documents. That is not the case here. An examination of the circumstances surrounding this motion demonstrates that Plaintiffs' motion and the relief sought is unwarranted and unnecessary, more so when there is still ample time for discovery to be completed. Therefore, Plaintiffs' motion should be denied.

II. STATEMENT OF THE FACTS

1. On December 14, Defendants, Northwest Neurology and Tessy Jenkins stipulated to the entry of Order to produce Discovery requests by December 31,

2020. Prior to that date, Defendants substantially complied with the Order regarding interrogatories.

2. The Discovery requests regarding documents were not complete because the documents sought has to be received after being requested from the custodians of such records, and most of the custodians were not readily available to provide some of the records.
3. Defendants' counsel has always communicated with Plaintiffs' counsel on the need to tarry awhile, while the records are retrieved, as Defendant's would not want to produce the documents piecemeal.
4. That at times like this, records recovery has become very difficult as most staff are either out of the office, or working remotely due to the COVID-19 pandemic.
5. It will be recalled that during the Rule 26 (f) conference, this court encouraged cooperation and understanding between the parties.
6. That at the time of filing this Answer, Defendants have substantially complied with the Discovery Requests, as Plaintiff's attorney has been served with supplementary responses to Interrogatories and Answers to Request for Production of Documents.

That Allstate eagerness to file a Motion to Compel is at odds with the court's pronouncement during the Rule 26 (f) Conference, that parties should work together with understanding that discovery materials may not be easily available considering the times we are in, and in the case of Northwest Neurology and Tessy Jenkins, MD, it is extremely difficult to produce all the documents required, more so, when this lawsuit

against them is baseless as will soon be proved to the court. (See attached Affidavit of Tessy Jenkins, MD).

Despite the vehement protestations of Plaintiffs' counsel, Defendants Northwest Neurology and Tessy Jenkins have not engaged in any willful conduct that could suggest a deliberate attempt to "delay the discovery train," that would justify the relief Plaintiffs' counsel seek. At the risk of sounding obnoxious, this court must also note that other parties to this case are still filing supplementary answers to discovery requests. Such candor should also be accorded Defendants, Northwest Neurology and Tessy Jenkins.

III. DISCUSSION

It is well-established that a "range of Choice" exists in how a District Court Judge may rule on a motion to compel. *United States v. Kelly*, 888 F.2d 732, 745 (11th Cir. 1989). However, before filing a motion to compel further disclosures or discovery pursuant to Rule 37(a), the aggrieved party must attempt to confer with the unresponsive party in an effort to obtain the desired materials without a court action. Granted that there were discussions surrounding production, defendants were working on producing the documents, and such information was conveyed to the Plaintiffs' attorney. Because of the difficulties of the times, defendants were not able to get the documents from the custodians. Defendants' counsel made this aware to Plaintiff's counsel.

A. UNSIGNED INTERROGATORIES

Plaintiffs' Counsel asserts that Defendant's Interrogatories were not signed. That is a fact, but it was inadvertent. Defendants' supplementary interrogatories have not only been signed, but have been notarized, pursuant to Fed. R. Civ. P. 33(b)(3). (see attached).

B. SOME OF ALLSTATE'S REQUESTS ARE NOT RELEVANT BECAUSE DEFENDANTS' SERVICES FOR THE PATIENTS WERE ONLY LIMITED TO NEUROLOGICAL MONITORING DURING PROCEDURES, AND NOTHING MORE.

Defendants admit that some of Plaintiffs' request are relevant, but contend that some are not. While the billing for the services rendered are relevant, personnel files and contract and financial dealings between the defendants in this conspiracy case are not because there is neither conspiracy nor any "complex fraudulent scheme). (See Defendants' Affidavit). The idea that Defendants Northwest Neurology conspired with other defendants is like a nightmare to Dr. Tessy Jenkins.

1. Importance of Issues

Allstate alleges that defendants engaged in a "comprehensive fraudulent scheme" to abuse Michigan No-Fault System. Nothing could be further from the truth. Defendant's Northwest Neurology and Tessy Jenkins have not, and will never engage in any such malfeasance. Defendants Northwest Neurology, in their Affidavit declared it has nothing to do with any possible RICO violations or fraudulent activities either on their own, or in connivance with any other party or parties.

2. Amount in Controversy is outrageous.

Allstate's amount in controversy (\$730,805.00) is spurious, at best, with regards to Northwest Neurology and Dr. Tessy Jenkins. While it is true that Northwest Neurology treats patients insured by Allstate (just like it provides Neurological services for to other patients insured by other insurance companies), the amount in controversy as stated by Allstate has little to do with services rendered by these two defendants. These defendants provide testing services when called upon to, and is not in cahoots with any other party to commit any crime, or defraud any entity. (See Defendant's Affidavit). It follows that the discovery request is so unreasonable that Allstate is asking Defendants to produce documents that are nonexistent. These discovery requests create a very outrageous burden on Defendants.

3. Most Information and Documents sought by Allstate are not relevant

Defendants have submitted to Allstate, all relevant information to enable it decipher the level of involvement by Northwest Neurology and Dr. Tessy Jenkins, who have made it clear in their answer to interrogatories, and the attached affidavit that they have no hand whatsoever in Allstate's RICO violation, and fraud claims. In fact, Allstate has not even paid for the services Defendants rendered, which are limited to providing neurological tests to IsPINE when called upon to do so. Defendants entered into no agreement whatsoever with any entity, and feels harassed by Allstate with this lawsuit.

Allstate says information would help identify witnesses, but the testing was performed by Dr. Jenkins alone, and was done outside of Northwest Neurology facility.

4. The Parties' Resources and Burden

Defendants hereby attach most of the requested documents, and would produce the defendant Tessy Jenkins' tax documents as soon as produced by defendants' accountant. However, requesting information on employee payroll, and W2's is not relevant in the instant case. Defendants object to these discovery requests. The rate of attrition in the lower-level medical employees cadre makes it burdensome because most of them no longer work at Northwest Neurology. Besides, these employees were never involved in the services which are the subject of this lawsuit. (Please see Affidavit of Tessy Jenkins).

C. SPECIFIC DISCOVERY DIFFICIENCIES

Defendants, Northwest Neurology has already produced most of the relevant information sought by Plaintiffs. One wonders what relevant rosters of employees have to do in a case where those employees make no decisions concerning operation of Northwest Neurology. The treatments were performed by Dr. Jenkins. Dr. Jenkins as a Neurologist. She makes the decisions, and the buck stops on her table. Regarding the medical records of patients, it should be made clear that the records with regards to this particular lawsuit are in possession of the physicians of the patients. Dr. Tessy Jenkins performed tests only. With regards to any other patient who are insured by Allstate, and who are not the subject of this lawsuit, Northwest Neurology is not obligated to submit

such information unless ordered by the court to do so, where the medical information will be protected.

There were a few verbal communications between Northwest Neurology and *IsPine* agents, and such communication centered on the monitoring performed. Plaintiffs state that Defendants' responses to interrogatories are non-substantive and clearly incomplete. It appears Plaintiffs want information where there are none. Plaintiff refers to Defendants' admission regarding Answers to Request to Admit No. 3. Plaintiff misrepresents Plaintiffs' answers. When asked to Admit that Stephan Pribil directed referrals of patients to Northwest Neurology during the relevant period: Plaintiff answered thus: "Admitted, maybe one or two patients. Very rarely." (Please see Defendants' Answer to Plaintiffs' Request to Admit No. 3. This does not in any way mean that the parties continuously refer patients to each other as Allstate's defense counsel seem to suggest. Defendant Northwest Neurology does not refer patients to *IsPine*. The relationship between the two entities concerns providing neurological testing/ monitoring during procedures by *IsPine*. Dr. Jenkins performs the testing, and monitoring, and her job is done after the procedure. That is where the relation ends. The only person who calls Defendants for the monitoring is Mr. Blake of *IsPine*.

Regarding general referrals; it must be noted that some physicians refer patients to Northwest Neurology; patients who need to see a neurologist. These referrals have nothing to do with the instant case. It is easy to see how irrelevant it is for defendants to name their referral sources. With regards to billings; the billings for the services rendered were done internally. Come to think of it, the billing is not the issue here.

Defendants have no knowledge of any sale of any accounts receivable to any entity named *Funding for Doctors*. Defendant Jenkins has seen the email, and does not recollect entering into any transaction by itself, or asking any entity to do so on its behalf. The email in question was not written by defendant, Tessy Jenkins, nor was she copied. Defendants intend to get to the root of this matter. You can't be said to be evasive to a matter you know nothing about.

IV. REQUEST FOR COSTS AND SANCTIONS PURSUANT TO RULE 37

Courts have broad discretion to impose sanctions. This power derives from the court's inherent power to manage its own affairs and to achieve the orderly and expeditious disposition of cases. *Flury v. Daimler Chrysler Corp.* 427 F.3d 939, 944 (2005); See also *Chambers v. NASCO, Inc.*, 501 U.S. 32, 43, 111 S. Ct. 2123, 2132 (1991). Accordingly, sanctions for discovery abuses are intended to prevent unfair prejudice to litigants and to ensure the integrity of the discovery process. *Flury v. Daimler Chrysler Corp.* 427 F.3d 939, 944 (11th Cir. 2005); see also *Gratton v. Great American Communications*, 178 F.3d 1373, 1374 (11th Cir. 1999).

"A Judge's decision as to whether a party or lawyer's action merit imposition of sanctions is heavily dependent on the court's firsthand knowledge, experience, and observation. At times the actions of the individual or party involved may be judged over the course of time." *Harris v. Chapman*, 97 F.3d 499, 506 (11th Cir. 1996). In the instant case, the judge encouraged litigants to cooperate with each other in making sure discovery materials are made available, with understanding that delay may not be intentional. This is more so when most people are out of work, as most clinics are closed, due to the pandemic that has devastated most businesses. Deficiency in

discovery materials especially when there is substantial compliance cannot be an excuse to ask for costs and sanctions. It must be made clear that defendants' responses, and inability of the defendant to sign the discovery documents are not intended to prevent the discovery of relevant information and to obstruct the discovery process. **To be sure, discovery is still ongoing, and ends on November 26, 2021.** Why, then the hurry to file a motion to compel, and asking for costs and sanctions? This is a typical example of lack of candor towards the opposing counsel. **Furthermore, any cost-shifting Order for filing this motion would be unjustified and premature, especially when discovery ends in 10 months.**

Defendants have not intentionally violated an order of this court, nor have they been disrespectful of this court. Defendants have made, and continue to make every effort to comply with the court's order. Documents have been produced pursuant to the Court's order. Asking for costs and sanctions is premature.

V. CONCLUSION

Therefore, based on the following, Defendants respectfully submit that this Court deny Plaintiffs' Motion to Compel and for Sanctions. Defendants further submit that they would be receptive to the appointment of a Court Appointed Monitor for the discovery matters should the Court decide that oversight of the discovery process is warranted.

WHEREFORE, Defendants, Tessy Jenkins and Northwest Neurology requests that this court deny Plaintiff's motion, as discovery is ongoing, and Plaintiffs' are not in any way prejudiced.

Respectfully Submitted

/s/ Paschal Ukpabi

Paschal C. Ukpabi (P71187)

Law Arena, PLLC

Attorney for Northwest Neurology and Tessy Jenkins,
24123 Greenfield Road, Ste. 309

Southfield, MI 48075

Tel. (248) 443-1218, Fax (248) 443-1359

Paschal.lawyer@gmail.com

Lawarenapllc07@gmail.com

February 23, 2021

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN**

CASE NO. 2:20-cv-12008-LVP-EAS

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
COMPANY; ALLSTATE PROPERTY
AND CASUALTY INSURANCE COMPANY;
ESURANCE INSURANCE COMPANY; and
ESURANCE PROPERTY AND CASUALTY
INSURANCE COMPANY.

HON. TERRANCE G. BERG

Plaintiffs,

V.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST NEUROLOGY, PC.;
PERFORMANCE ORTHOPEDICS OF MICHIGAN PLLC;
BRR MEDICAL SUPPLY, INC.; GULF COAST
MEDICAL SERVICES, LLC; CCT MEDICAL SUPPLIES, INC;
STEFAN PRIBIL, M.D.; WESLEY BLAKE BARBER;
TESSY JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

CERTIFICATE OF FILING AND SERVICE

I, the undersigned, hereby certify that on February 23, 2021, I served all attorneys of record, with Defendants Tessy Jenkins and Northwest Neurology's Answer to Plaintiff's Motion to Compel Discovery, and for Costs and Sanctions by e-file.

/s/ Paschal Ukpabi
Paschal C. Ukpabi (P71187)
Law Arena, PLLC
Attorney for Northwest Neurology and Tessy Jenkins,
24123 Greenfield Road, Ste. 309
Southfield, MI 48075

Tel. (248) 443-1218, Fax (248) 443-1359

February 23, 2021

AFFIDAVIT OF
TESSY JENKINS, MD

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

CASE NO. 2:20-cv-12008-LVP-EAS

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
COMPANY; ALLSTATE PROPERTY
AND CASUALTY INSURANCE COMPANY;
ESURANCE INSURANCE COMPANY; and
ESURANCE PROPERTY AND CASUALTY
INSURANCE COMPANY.

Plaintiffs,

V.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST NEUROLOGY, PC.;
PERFORMANCE ORTHOPEDICS OF MICHIGAN PLLC;
BRR MEDICAL SUPPLY, INC.; GULF COAST
MEDICAL SERVICES, LLC; CCT MEDICAL SUPPLIES, INC;
STEFAN PRIBIL, M.D.; WESLEY BLAKE BARBER;
TESSY JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

AFFIDAVIT OF TESSY JENKINS

I, Tessa C. Jenkins, in support of my defense, and the defense of Northwest Neurology, state as follows:

1. That I am a Citizen of Michigan, and Citizen of the United States.
2. That I am a physician, and also a Board-Certified Neurologist with 25 years experience.
3. That I am the owner, and Medical Director of Northwest Neurology Clinic, located at 27200 Lahser Road, Southfield, MI 48034.

4. That Northwest Neurology services patients who have neurological problems, and also neurology-related ailments.
5. That I have never been involved in any medical insurance fraud, and have never submitted bills for services not rendered.
6. That I was contacted by Ispine to perform monitoring of their patients' neurological system during surgical operations.
7. That the services I performed on behalf of Northwest Neurology was monitoring of the patients during surgical operations, and nothing more.
8. That neither my person nor Northwest Neurology participated in the diagnoses or surgical operations performed by Ispine, PLLC.
9. That I have neither business nor personal relationships with other defendants in this case; specifically, neither Northwest Neurology nor my person has any interest whatsoever in Ispine, or any other defendant in this case.
10. That neither Ispine nor any person or entity associated with Ispine has any business or financial interest in Northwest Neurology.
11. That the charges for services rendered to patients were submitted to Allstate by my clinic, and not in conjunction with any other defendant, and that such billings were for medically necessary neurological services, that were actually rendered and lawfully carried out in relation to both Allstate Insurance Company and the patients.
12. That Northwest Neurology does not, and have not done any co-billing with any entity, including defendants in this case.
13. That all services rendered by Northwest Neurology and Tessy Jenkins were medically necessary, and the fees charged for services performed, and were not fraudulently earned.
14. That I, as a Neurologist can say, with medical certainty, that Inoperative Neuromonitoring (IONM) is used on two kinds of patients: (i) operation on the lumbar vertebrae, and (ii) operation on the cervical vertebrae, and I have no idea whether my IONM billing was used by any party to determine the necessity of surgical procedures, especially when I only performed monitoring of the procedures.

15. That neither myself nor Northwest Neurology was not aware of what was done after the monitoring of the patient, and was not part of a "predetermined protocol."
16. That IONM techniques billed by Northwest Neurology – Soma to Sensory Evoked Potentials ("SSEP") testing is done by monitoring changes in peripheral nerve signals (using electrodiagnostic monitoring equipment and sensors attached to the patient during surgery only), and at the end of the procedure, a report is made to the neurosurgeon, who decides who then decides what to do with the report.
17. That Tessy Jenkins and Northwest Neurology only obtained a baseline EMG reading for patient KH (Claim NO. 0220521920) C5-6 vertebral level, and therefore cannot be responsible for any medical procedure done on any other vertebral level.
18. That the IONM performed by Tessy Jenkins and Northwest Neurology were in situations where there is a potential damage to neural integrity. The decision is backed by Tessy Jenkins medical experience as a Board-Certified Neurologist; the billings were done for reasonably necessary service, and medically necessary service and done in line with best medical practices.
19. That Tessy Jenkins and Northwest Neurology did not submit any false document that materially misrepresented the services they performed.
20. That all tests performed by Northwest Neurology were ordered by the treating Neurosurgeons at Ispine.
21. That if called to testify as to the truth of the forgoing statements, I Tessy Jenkins, MD will be willing and able to do so.
22. That these statements are made without reservations, and believing them to be true to the best of my knowledge.

FURTHER, Affiant sayeth not.

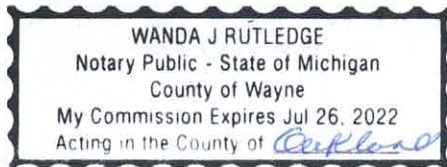
Sworn to before me, this 18th day of February, 18th, 2021. My Commission expires on July 26, 2022



Notary Public



Tessy C. Jenkins, MD
Affiant



DISCOVERY MATERIALS

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
INSURANCE COMPANY; ALLSTATE
PROPERTY AND CASUALTY INSURANCE
COMPANY; ESURANCE INSURANCE
COMPANY; and ESURANCE PROPERTY
AND CASUALTY INSURANCE COMPANY,

C.A. No. 20-cv-12008-LVP-EAS

Plaintiffs,

v.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST
NEUROLOGY, P.C.; PERFORMANCE
ORTHOPEDICS OF MICHIGAN PLLC; CCT
MEDICAL SUPPLIES, INC; STEFAN PRIBIL,
M.D.; WESLEY BLAKE BARBER; TESSY
JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

**DEFENDANT, TESSY JENKINS, MD'S ANSWER TO PLAINTIFFS' FIRST
INTERROGATORIES.**

INTERROGATORIES

NOW COMES Defendant, Tessa Jenkins, by and through her attorney, Paschal Ukpabi, and for her answer to Defendant's First Set of Interrogatories, state as follows:

1. Please identify any and all entities you owned or controlled during the relevant period. A responsive answer will identify the entity by name, its primary place of business, and your role therein.

Answer

Northwest Neurology PC - President

Associated physical therapy PLLC (closed)

2. Please identify all entities at which you were employed, contracted, and/or affiliated during the relevant period. A responsive answer shall include, but not be limited to, the duration of your employment/contract/affiliation at each entity, the nature of your job responsibilities at each entity, and the payments you received from each entity.

Answer

Northwest Neurology PC - President

Associated physical therapy PLLC (closed)

3. Please identify all individuals and/or entities you employed and/or contracted with for the referral of patients to entities you owned, managed, and/or controlled during the relevant period. A responsive answer will identify the individuals or entities by name, the period of time referrals were rendered, and the source of the referrals.

Answer

Referrals are routinely made from Northwest Neurology to numerous practitioners including physicians, hospital emergency rooms, physical therapists, psychologists, testing centers, laboratories, imaging centers. A comprehensive list of these providers would be too extensive to list here.

4. Please describe how you tracked and/or recorded the source of each patient referral to you and/or the entities you owned or controlled during the relevant period.

Sources of referral were entered into the patient's demographic data at the time of initial encounter in the clinic

Answer

5. Please provide the gross annual revenue of each entity you owned or controlled for each year of the relevant period, including the percentage of the revenue for each year that was received from automobile insurers.

Annual revenue of Northwest Neurology is between \$750,000.00 and \$850,000.00

There is no current revenue for Associated physical therapy.

Answer

6. Please describe the relationship between you and each of the defendants named in Allstate's Complaint during the relevant period. A responsive answer shall include, but is not limited to, how the relationship began, the length of the relationship, and any agreements (financial or otherwise) between you and each of the defendants named in Allstate's Complaint.

I have no previous or ongoing relationships with Surgical center of Southfield, LLC;

Performance orthopedics of Michigan PLLC; CCT medical supplies, Inc;

I have professional relationships with Stefan Pribil, M.D.; Wesley Blake Barber;

and Robert Swift, D.O

Answer

7. Please identify all accountants and/or accounting firms that have provided services to you during the relevant period, including but not limited to any bookkeeping functions, financial planning and investments, and preparation of tax documents.

A-MAC Accounting

Answer

8. Please identify all bank and financial accounts you owned or had access to and the individual(s) or entity(ies) with signing authority related to each account during the relevant period. A responsive answer will include the name of the financial institution, the type of account, and the account number.

Comerica Bank, checking and savings accounts. Defendant regards as privileged information, the account number of the business, and will only disclose such information by a court order.

Answer

9. Please identify any and all email addresses created, controlled, and/or otherwise used by you (both personal and business) during any part of the relevant period.

Answer

nwneurology215@yahoo.com
nwnneurology@gmail.com
drjenk@yahoo.com

10. Please identify any and all phone numbers created, controlled, and/or otherwise used by you (both personal and business), including identification of the carrier for each number, during any part of the relevant period.

248-208-9215 (office)

313-595-6600 (cell)

Answer

11. Please identify any entity to which you or any entity in which you held an ownership interest sold, conveyed, transferred, and/or advanced accounts receivable

during the relevant period. A responsive answer shall describe the relationship with each entity and include, but is not limited to, how the relationship began, the length of the relationship, the terms of any agreement with such entity, and any financial and/or patient referral agreements between you and such entity.

Edwards Medical Billing 2012 - 2020

H & S billing 9/2019 – 4/2020

Miller Medical Billing LLC 3/20-date

Answer

12. Please describe any criminal investigation (whether or not such investigation ever led to criminal charges) taken against you by any state or federal agency. A responsive answer will identify the agency which brought the investigation, the nature of the investigation, the date of said investigation, and the result of said investigation.

Answer

None

13. Please identify any common or joint defense agreement that you have entered into with any other individual or entity named as a defendant in Allstate's Complaint.

Answer

None

Respectfully Submitted

LAW ARENA, PLLC

/s/Paschal Ukpabi

PASCHAL C. UKPABI (P71187)

Attorney for Plaintiff

24123 Greenfield Road, Ste. 309

Southfield, MI 48075

Tel. (248) 443-1218)

PROOF OF SERVICE

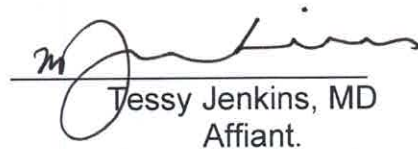
I, the undersigned, hereby certify that on February 17, 2021, I served all attorneys of record, with Defendant Tessy Jenkins Answer to Defendant's First Interrogatories by e-mail.

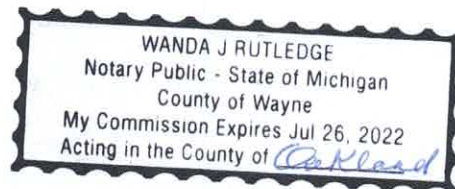
/s/ Paschal Ukpabi

Dated: February 17, 2021

Sworn before me, this 18th day of February, 2021. My Commission expires on July 26, 2022


Notary Public


Tessy Jenkins, MD
Affiant.



UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
INSURANCE COMPANY; ALLSTATE
PROPERTY AND CASUALTY INSURANCE
COMPANY; ESURANCE INSURANCE
COMPANY; and ESURANCE PROPERTY
AND CASUALTY INSURANCE COMPANY,

C.A. No. 20-cv-12008-LVP-EAS

Plaintiffs,

v.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST
NEUROLOGY, P.C.; PERFORMANCE
ORTHOPEDICS OF MICHIGAN PLLC; CCT
MEDICAL SUPPLIES, INC; STEFAN PRIBIL,
M.D.; WESLEY BLAKE BARBER; TESSY
JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

**DEFENDANT NORTHWEST NEUROLOGY, P.C.'S ANSWER TO
PLAINTIFFS' FIRST INTERROGATORIES**

INTERROGATORIES

NOW COMES Defendant, Northwest Neurology, by and through her attorney, Paschal Ukpabi, and for her answer to Defendant's First Set of Interrogatories, state as follows:

1. Please identify the person or persons answering these interrogatories on behalf of Northwest Neurology. A responsive answer shall include the full name, address,

job title, and association to Northwest Neurology for the person or persons answering these interrogatories and, for each person, state which interrogatory he/she answered.

Answer

Tessy Jenkins, MD. Board certified Neurologist. President of Northwest Neurology

2. Please identify each and every owner, member, manager, and director of Northwest Neurology during any part of the relevant period. A responsive answer will include the name, address, current contact information, title, professional licensure, and years of affiliation with Northwest Neurology.

Answer

Tessy Jenkins, MD. Board certified Neurologist. President of Northwest Neurology

3. Please identify all individuals employed and/or contracted by Northwest Neurology during the relevant period. A responsive answer will include the name, address, current contact information, job title, professional licensure (if applicable), and years of employment/affiliation of each and every Northwest Neurology employee/contractor, including part-time, full-time, contract-based employees, independent contractors, and consultants.

Answer

Tessy C Jenkins, MD, Linda Abbo NP-C (Oct 2019 – Jul 2020) , Marianne McKissick PA-C (Aug 2018 -Oct 2019), Cicely Fisher (2005 – date), Ramsey Abbasi – independent contractor (2010 – date), Endalyn Oga-Eluwa (2015-date),

Cynthia Gooden (2018 – date), Tomoi Rambus (2019 – date), Kevin Hines (2019 – date), Linda Taylor-Fossano (Oct 2020-date).

4. Please identify any and all billing companies used by Northwest Neurology during the relevant period. A responsive answer will identify the billing company by name, the period of time services were rendered, contact person(s), address(es), and phone number(s).

Answer

Edwards Medical Billing 2012 – 2020; H & S billing 9/2019 – 4/2020; Miller Medical Billing LLC 3/20-date

5. Please identify the person(s) responsible for creating the bills submitted to Allstate by Northwest Neurology during the relevant period. A responsive answer shall include, but not be limited to, identification of the person responsible for selecting the billing and diagnosis codes included in each bill submitted to Allstate during the relevant period.

Answer

Edwards Medical Billing, H & S billing, Miller Medical Billing, and Northwest Neurology.

6. Please identify by name all payors (including but not limited to automobile insurance companies, health insurance companies, and government agencies) to which Northwest Neurology submitted bills during the relevant period.

Answer

Medicare, Medicaid, Blue Cross Blue Shield, Blue Care Network, HAP, Most HMOs, Cash payments, Medicare and Medicaid HMOs, Private insurance, Auto Insurance, Workmans Comp, Veterans Administration Insurance.

7. Please identify all persons and/or entities (including law firms) from whom Northwest Neurology obtained patients during the relevant period. A responsive answer shall include the name, address, and phone number of the party(ies) from whom patients were obtained.

Answer

Patients came from various sources including hospital discharge, nursing home discharge, physician referrals, home health agency referrals, Medicaid insurance referrals, private insurance referrals, Zocdoc referrals, case managers, and various attorneys.

8. Please identify every piece of equipment used by Northwest Neurology to perform diagnostic testing during the relevant period. A responsive answer shall include the name of the manufacturer and model number of each piece of equipment used during the relevant period, the acquisition date of each piece of equipment, whether each piece of equipment is leased or owned, the owner of each leased piece of equipment, the amount initially paid to acquire each piece of equipment, the origin of the funds used to acquire each piece of equipment, and the individual who contracted to lease and/or purchase each piece of equipment on behalf of Northwest Neurology.

Answer

Natus VikingQuest with 4 channel Amplifier - \$20,000

Cadwell Cascade Pro with 16 channel Amplifier - \$41,483.63

9. Please describe how Northwest Neurology tracked and/or recorded the source of each patient referral to it during the relevant period.

EMR (electronic medical record) documentation

10. Please identify all policies and/or procedures in effect during the relevant period that ensure Northwest Neurology only performed medically necessary medical procedures.

Northwest Neurology followed policies of the American Academy of Neurology

Answer

11. Please describe in detail the process utilized when a new patient presented for treatment at Northwest Neurology during the relevant period. Include identification of all forms that are filled out by new patients, all standard questions asked, all standard instructions given, all examinations that are performed at the first visit, and all treatment that is provided at the first visit.

Answer

Basic demographics - name, address, referring physician, primary physician, telephone number, next of kin, emergency contact

Insurance/billing information

Auto/accident information including attorneys, case managers.

Legal information - Consent forms for treatment and payment, obtaining medical information, release of medical information, list of individuals for authorized access.

12. Please provide the gross annual revenue of Northwest Neurology for each year during the relevant period, including the percentage of the revenue for each year that was received from automobile insurers.

Answer

Annual revenue of Northwest Neurology is between \$750,000.00 and \$850,000.00

13. Please describe any and all billing guidelines, protocols, and treatises used by any employee/independent contractor/affiliate/representative of Northwest Neurology during the relevant period.

Answer

All billing is performed using CPT (current procedural terminology) codes.

14. Please provide the average total number of patients treated each day at Northwest Neurology and the percentage of patients treated at Northwest Neurology who reported having been involved in an automobile accident.

Average daily number of patients – 15-25/day

Average daily number involved in automobile accidents – 1-2/day

15. Please describe the relationship between Northwest Neurology and each of the defendants named in Allstate's Complaint during the relevant period. A responsive answer shall include, but is not limited to, how the relationship began, the length of the relationship, and any financial agreements between you and any of the defendants named in Allstate's Complaint.

Answer

Northwest Neurology had a clinical and professional relationship which included the care of patients only.

16. Please identify all accountants and/or accounting firms that have provided services relative to Northwest Neurology during the relevant period, including but not limited to, any bookkeeping functions and preparation of tax filing documents.

Answer

A-MAC Accounting

17. Please identify all bank and financial accounts Northwest Neurology owned or had access to and the individual(s) or entity(ies) with signing authority related to each account during the relevant period. A responsive answer will include the name of the financial institution, the type of account, and the account number.

Comerica Bank, checking and savings accounts

Answer

18. Please identify all electronic mail addresses associated with Northwest Neurology during the relevant period, including identifying the individual associated with each such electronic mail address and that person's role with Northwest Neurology.

Answer

nwneurology215@yahoo.com

nwnneurology@gmail.com

drjenk@yahoo.com

Respectfully Submitted

LAW ARENA, PLLC

/s/Paschal Ukpabi
PASCHAL C. UKPABI (P71187)
Attorney for Plaintiff
24123 Greenfield Road, Ste. 309
Southfield, MI 48075
Tel. (248) 443-1218)

PROOF OF SERVICE

I, the undersigned, hereby certify that on February 18th, 2021, I served all attorneys of record, with Defendant Northwest Neurologist's amemded Answer to Defendants' Interrogatories, by e-mail.

/s/ Paschal Ukpabi

Dated: February 17, 2021

Sworn before me, this 18th day of February, 2021. My Commission expires on July 26, 2022.

Wanda J Rutledge
Notary Public

Tessy Jenkins, MD
Affiant.

WANDA J RUTLEDGE
Notary Public - State of Michigan
County of Wayne
My Commission Expires Jul 26, 2022
Acting in the County of Oakland

REQUEST FOR PRODUCTION
OF
DOCUMENTS

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
INSURANCE COMPANY; ALLSTATE
PROPERTY AND CASUALTY INSURANCE
COMPANY; ESURANCE INSURANCE
COMPANY; and ESURANCE PROPERTY
AND CASUALTY INSURANCE COMPANY,

C.A. No. 20-cv-12008-LVP-EAS

Plaintiffs,

v.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST
NEUROLOGY, P.C.; PERFORMANCE
ORTHOPEDICS OF MICHIGAN PLLC; CCT
MEDICAL SUPPLIES, INC; STEFAN PRIBIL,
M.D.; WESLEY BLAKE BARBER; TESSY
JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

**PLAINTIFFS' FIRST REQUESTS FOR ADMISSIONS TO DEFENDANT
NORTHWEST NEUROLOGY, P.C.**

REQUESTS FOR ADMISSION

NOW COMES Defendant, Tessy Jenkins, by and through her attorney, Paschal Ukpabi,
and in answer to Defendants' Request for Admission, state as follows:

1. Please admit that Tessy Jenkins, M.D. ("Jenkins") operated and controlled
Northwest Neurology during the relevant period.

Answer: Admitted

2. Please admit that Northwest Neurology was managed by Jenkins during the relevant period.

Answer: Admitted

3. Please admit that Stefan Pribil, M.D. ("Pribil") directed referrals of patients to Northwest Neurology during the relevant period.

Answer: Admitted, but maybe one or two patients. Very rarely.

4. Please admit that Wesley Blake Barber ("Barber") directed referrals of patients to Northwest Neurology during the relevant period.

Answer: Denied

5. Please admit that Jenkins directed referrals of patients at Northwest Neurology during the relevant period.

Tessy Jenkins owns Northwest Neurology.

6. Please admit that Northwest Neurology maintained a patient referral agreement with individuals who were not licensed medical providers during the relevant period.

Answer: Denied

7. Please admit that Barber is not licensed to practice medicine in the State of Michigan.

Answer: I lack sufficient information to form an opinion.

8. Please admit that Allstate Insureds were referred to Northwest Neurology based on a patient referral agreement and not due to medical necessity during the relevant period.

Answer: Denied.

9. Please admit that Pribil directed the provision of treatment at Northwest Neurology during the relevant period.

Answer: Denied.

10. Please admit that Barber directed the provision of treatment at Northwest Neurology during the relevant period.

Answer: Denied.

11. Please admit that Jenkins directed the provision of treatment at Northwest Neurology during the relevant period.

Answer: Admitted

12. Please admit that Northwest Neurology received compensation from attorneys for referring patients to attorneys during the relevant period.

Answer: Denied.

13. Please admit that Northwest Neurology compensated attorneys for referring patients to Northwest Neurology during the relevant period.

Answer: Denied.

14. Please admit that Northwest Neurology obtained information regarding potential patients involved in motor vehicle accidents from ISpine.

Answer: Denied.

15. Please admit that Northwest Neurology obtained information regarding potential patients involved in motor vehicle accidents from Barber.

Answer: Denied.

16. Please admit that Northwest Neurology compensated ISpine for referring patients to Northwest Neurology during the relevant period.

Answer: Denied.

17. Please admit that Northwest Neurology compensated Barber for referring patients to Northwest Neurology during the relevant period.

Answer: Denied.

18. Please admit that Jenkins held a financial interest in Northwest Neurology during the relevant period.

Answer: Admitted

19. Please admit that Barber held a financial interest in Northwest Neurology during the relevant period.

Answer: Denied.

20. Please admit that Barber contributed capital to Northwest Neurology during the relevant period.

Answer: Denied.

21. Please admit that Northwest Neurology did not obtain medical records relating to Allstate Insureds prior to initiating treatment at Northwest Neurology.

Answer: Admitted. Northwest Neurology performed only neurological testing during procedures.

22. Please admit that Northwest Neurology billed for intraoperative neuromonitoring on patients during procedures that was not medically necessary.

Answer: Denied.

23. Please admit that Northwest Neurology compensated at least one individual for referring patients to treat with Northwest Neurology during the relevant period.

Answer: Denied.

24. Please admit that Northwest Neurology performed neurologic testing on patients in exchange for payment.

Answer: Admitted

25. Please admit that Northwest Neurology ordered patients to undergo neurologic testing and evaluations that did not have any medical basis.

Answer: Denied.

26. Please admit that the appropriate use of intraoperative neuromonitoring does not include making real-time diagnoses during surgical procedures.

Answer: Admitted that Northwest Neurology did not make any diagnostic decisions. The diagnoses have already been done. Northwest Neurology did only neurological monitoring/ testing.

27. Please admit that ambulatory electroencephalograms (“EEG”) are used to detect seizures and to confirm diagnoses of epilepsy.

Answer: Admitted

28. Please admit that transcranial Doppler arterial examinations are used to evaluate and diagnose strokes and aneurysms.

Answer: Admitted

29. Please admit that Northwest Neurology billed for EEG testing on Allstate Insureds that had no medical basis.

Answer: Denied

30. Please admit that Northwest Neurology billed for transcranial Doppler arterial examinations on Allstate Insureds that had no medical basis.

Answer: Denied

31. Please admit that Allstate Insureds who presented to Northwest Neurology were prescribed the same course of treatment regardless of the specific patient's condition.

Answer: Denied.

32. Please admit that Northwest Neurology utilized a predetermined treatment protocol for patients during the relevant period.

Answer: Denied.

33. Please admit that Northwest Neurology employees and representatives communicated with each other via email during the relevant period.

Answer: Admitted

34. Please admit that Northwest Neurology employees and representatives communicated with each other via text message during the relevant period.

Answer: Lack sufficient knowledge and information to form an opinion.

35. Please admit that Northwest Neurology employees and representatives communicated with other defendants named in this action via email during the relevant period.

Answer: Lack sufficient knowledge and information to form an opinion.

36. Please admit that Northwest Neurology employees and representatives communicated with other defendants named in this action via text message during the relevant period.

Answer: Lack sufficient knowledge and information to form an opinion.

37. Please admit that Northwest Neurology received a greater percentage of its income from automobile insurers than from any other single payor source during the relevant period.

38. Please admit that Northwest Neurology mailed two or more documents to Allstate through the U.S. Mail during the relevant period.

Answer: Admitted, mostly through our biller.

39. Please admit that Northwest Neurology faxed two or more documents to Allstate through the U.S. Mail during the relevant period.

Answer: Lack sufficient knowledge and information to form an opinion.

40. Please admit that Northwest Neurology was aware that ISpine mailed two or more documents to Allstate through the U.S. Mail during the relevant period.

Answer: Denied.

41. Please admit that Northwest Neurology was aware that ISpine faxed two or more documents to Allstate through the U.S. Mail during the relevant period.

Answer: Denied.

42. Please admit that you expected insurance companies to rely on the bills submitted to them by healthcare providers through the U.S. Mail during the relevant period.

Answer: I can only speak for Tessy Jenkins and Northwest Neurology

43. Please admit that you expected insurance companies to rely on the bills submitted to them by healthcare providers through faxes during the relevant period.

Answer: I can only speak for Tessy Jenkins and Northwest Neurology

44. Please admit that you expected insurance companies to pay the bills submitted to them by healthcare providers through the U.S. Mail during the relevant period.

Answer: I can only speak for Tessy Jenkins and Northwest Neurology

45. Please admit that you expected insurance companies to pay the bills submitted to them by healthcare providers through faxes during the relevant period.

Answer: I can only speak for Tessy Jenkins and Northwest Neurology

46. Please admit that you were aware that automobile insurers accepted medical records through the U.S. Mail during the relevant period.

Answer: I can only speak for Tessy Jenkins and Northwest Neurology

47. Please admit that you were aware that automobile insurers accepted medical records through faxes during the relevant period.

I lack sufficient knowledge and information to form an opinion

Respectfully Submitted

LAW ARENA, PLLC

/s/Paschal Ukpabi
PASCHAL C. UKPABI (P71187)
Attorney for Plaintiff
24123 Greenfield Road, Ste. 309
Southfield, MI 48075
Tel. (248) 443-1218)

PROOF OF SERVICE

I, the undersigned, hereby certify that on February ____, 2020, I served all attorneys of record, with Defendant Northwest Neurology's amended Answer to Defendant's Request to Admit, by email.

/s/ Paschal Ukpabi

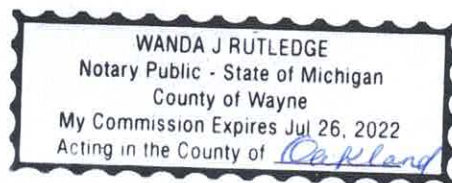
Dated: February 17, 2021

Sworn before me, this 18th day of February, 2021. My Commission expires on

July 26, 2022

Wanda J Rutledge
Notary Public

Tessy Jenkins
Tessy Jenkins, MD
Affiant.



UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

ALLSTATE INSURANCE COMPANY;
ALLSTATE FIRE AND CASUALTY
INSURANCE COMPANY; ALLSTATE
PROPERTY AND CASUALTY INSURANCE
COMPANY; ESURANCE INSURANCE
COMPANY; and ESURANCE PROPERTY
AND CASUALTY INSURANCE COMPANY,

C.A. No. 20-cv-12008-LVP-EAS

Plaintiffs,

v.

ISPINE, PLLC; SURGICAL CENTER OF
SOUTHFIELD, LLC; NORTHWEST
NEUROLOGY, P.C.; PERFORMANCE
ORTHOPEDICS OF MICHIGAN PLLC; CCT
MEDICAL SUPPLIES, INC; STEFAN PRIBIL,
M.D.; WESLEY BLAKE BARBER; TESSY
JENKINS, M.D.; and ROBERT SWIFT, D.O.,

Defendants.

**DEFENDANT, NORTHWEST NEUROLOGY'S ANSWER TO PLAINTIF'S FIRST
REQUESTS FOR PRODUCTION OF DOCUMENTS.**

ANSWER TO REQUESTS FOR PRODUCTION OF DOCUMENTS

1. All documents referred to and relied upon in preparing Northwest Neurology's disclosures pursuant to Fed. R. Civ. P. 26(a).

Answer: See Attached

2. All documents related to the ownership and corporate formalities of Northwest Neurology during the relevant period, including, but not limited to, certificates of incorporation or organization, stock certificates, by-laws, corporate resolutions, minutes of meetings, profit

distributions, transfer of ownership or management documents, dissolution/windup papers, and partnership and/or operating agreements.

Answer: See attached Certificate of Incorporation. Other questions do not apply.

3. All personnel files for all employees, independent contractors, and affiliates of Northwest Neurology during the relevant period, including, but not limited to, resumes/curriculum vitae, employment/contractor agreements, W-2, 1099, K-1, and/or other tax forms/statements, disciplinary records, hiring letters, and letters of resignation/termination.

Answer: These materials demanded are irrelevant, and not related to the discovery of discoverable evidence. See FRE 402. The personnel files for all employees is not relevant here, and Defendant objects to this request.

4. Any and all rosters or other written lists of employees, independent contractors, and affiliates of Northwest Neurology during the relevant period.

Answer: These materials demanded are irrelevant. These entities were not part of the testing done by Northwest Neurology. Please see FRE: 402

5. Any and all documents identifying vendors or suppliers of medical equipment and any other item Northwest Neurology uses in its provision of medical treatment and services during the relevant period.

Answer: Please see attached.

6. Any and all documents describing the use of medical equipment used by Northwest Neurology to perform the medical procedures and tests identified by Allstate's Complaint and the exhibits thereto, including equipment used during all neurologic testing and intraoperative neuromonitoring.

Answer: Please see attached.

7. Any written agreements of any nature by and between Northwest Neurology and any individual or entity that provided marketing and/or advertising services to or on behalf of Northwest Neurology during any part of the relevant period.

Answer: Northwest Neurology does not engage in marketing agreements

8. All marketing materials and other documents/media used by Northwest Neurology to obtain patients, including, but not limited to, advertisements and promotional materials.

Answer: Northwest Neurology does not engage in marketing and advertising.

9. All documents tracking the referral sources of Allstate Insureds to Northwest Neurology during the relevant period.

Answer: N/A

10. All written agreements of any nature by and between Northwest Neurology and any attorney or law firm to whom referrals were made by Northwest Neurology and/or any attorney or law firm from whom Northwest Neurology received referrals of patients who were involved in motor vehicle accidents.

Answer: N/A

11. All agreements, documents, and communications between Northwest Neurology and any entity that provided funding or factoring related to Northwest Neurology's accounts receivable, or who purchased Northwest Neurology's accounts receivable, during the relevant period.

Answer: N/A

12. All documents related to protocols and guidelines that Northwest Neurology used in providing medical services to patients and/or in submitting claims, including but not limited to employee handbooks, treatment guidelines, and billing guidelines.

Answer: Protocols are listed on the reports after surgery.

13. All documents related to claims that Northwest Neurology submitted or caused to be submitted to Allstate during the relevant period, including, but not limited to, complete medical records for each Allstate Insured, test results, notes, bills, referrals for treatment, consultations, medical equipment and devices, sign-in sheets, prescriptions, orders, and communications related to all Allstate Insureds. This request specifically demands the actual and complete results and data for all diagnostic testing, intraoperative neuromonitoring, and electroencephalograms billed by Northwest Neurology.

Answer: Please see attached.

14. All communications and documents (including drafts) relating to the creation, development, and implementation of recurring order and/or requisition forms that were used by Northwest Neurology during the relevant period.

Answer: N/A

15. All documents related to protocols and procedures that Northwest Neurology followed in providing diagnostic testing to patients, including but not limited to employee handbooks, treatment guidelines, and billing guidelines.

Answer: Defendant, Northwest Neurologist did not utilize any treatment guidelines because it only performed testing. Only testing protocols were provided. Northwest Neurology did not perform any diagnosis on any of the patients. Employees were not part of the testing which was done outside of Northwest Neurology facility.

16. All documents relating to any and all educational materials dispensed by Northwest Neurology or on behalf of Northwest Neurology to referring providers relating to the use of intraoperative neuromonitoring.

Answer: N/A. Northwest neurology does not educate IsPINE, who are neurosurgeons.

17. All transcripts of any testimony or sworn statement made or given by any owner, officer, employee, director, agent, or representative of Northwest Neurology relating to Northwest Neurology during the relevant period.

Answer: No testimony or sworn statement. N/A

18. All communications and documents related to how Northwest Neurology chose its billing rates.

Answer: The billing rates were supplied by IsPINE according to community standards regarding similar services.

19. All reports, analyses, and other documents referred to, consulted, relied upon, or generated for the purposes of determining the medical necessity of the medical treatments, products, and services billed relative to Allstate Insureds during the relevant period.

Answer: Please see attached documents.

20. Any and all communications wherein the treatment of an Allstate Insured is discussed by a representative of Northwest Neurology during the relevant period.

Answer: None; N/A

21. All documents relating to contractual relationships, financial arrangements, and/or written agreements of any nature between Northwest Neurology and each referring provider, including each of the defendants named in Allstate's Complaint, that were in effect at any time during the relevant period.

Answer: N/A. None

22. Any and all communications (including, but not limited to, e-mails and text messages) between you and any of the defendants named in Allstate's Complaint during the relevant period.

Answer: None. Communications were done by phone, whenever my services were needed.

23. All communications between you and any billing agency or biller relating to (a) Allstate Insureds, (b) contractual relationships, (c) financial arrangements, (d) referral agreements, (e) recruitment, solicitation or procurement of patients/clients, and/or (f) other business relationships or business opportunities during the relevant period.

Answer: None. The billing was internal.

24. All documents and communications between any representative of Northwest Neurology and an attorney/law firm representing an Allstate Insured wherein the legal representation of an Allstate Insured is discussed during the relevant period.

Answer: None

25. All documents and communications between any representative of Northwest Neurology and an attorney/law firm representing an Allstate Insured wherein the medical treatment of an Allstate Insured is discussed during the relevant period.

Answer: None

26. All state and federal tax returns filed by (or on behalf of) Northwest Neurology during the relevant period, including all documents used in the preparation of such tax returns, including but not limited to W-2s and 1099-MISC forms.

Answer: Please see attached

27. All documents related to financial accounts controlled, owned, and/or otherwise used by Northwest Neurology during the relevant period, including but not limited to, all bank,

trust, savings, checking, money-market, and/or accounts into which funds were deposited and/or from which they were withdrawn by someone on Northwest Neurology's behalf and/or at its direction.

Answer: Please see attached, but Allstate has not made any payment.

28. All documents related to Northwest Neurology's utilization of revenue, including general ledgers, balance sheets, profit and loss statements, income statements, annual budgets, and disbursement logs, during the relevant period.

Answer; Please see attached

29. All documents and communications between you and any person wherein the collection of outstanding monies generated by Northwest Neurology or any other entity that you claim an ownership interest in is discussed during the relevant period.

Answer: None

30. All documents relating to contractual relationships, financial arrangements, and/or written agreements of any nature between you and any of the defendants named in Allstate's Complaint during the relevant period.

Answer; None

31. All documents relating to contractual relationships, financial arrangements, and/or written agreements of any nature between Northwest Neurology and Funding4Doctors, LLC that was in effect during any part of the relevant period:

Answer: None

32. All invoices, cash receipts, and other evidence of payment generated by Northwest Neurology relating to patients who paid for medical services in cash during the relevant period.

Answer; Please see attached

33. All purchase documents, certificates of registration, or lease agreements for any medical equipment purchased, rented, used, and/or leased by Northwest Neurology during the relevant period.

Answer: Please see attached

34. Any and all communications (including, but not limited to, e-mails and text messages) between Northwest Neurology and the manufacturer and/or distributor of any software utilized by Northwest Neurology in relation to the treatment of Allstate Insureds during the relevant period.

Answer: None

35. All documents and records related to any criminal, regulatory, agency, tax, and/or disciplinary investigation taken against Northwest Neurology and any owner or employee of Northwest Neurology by any state and/or federal agency during the relevant period.

None

36. Any and all documents that you will use, intend to use, and/or may use at trial and/or rely on at trial.

Answer: Please see attached

Respectfully Submitted

LAW ARENA, PLLC

/s/Paschal Ukpabi
PASCHAL C. UKPABI (P71187)
Attorney for Plaintiff
24123 Greenfield Road, Ste. 309
Southfield, MI 48075
Tel. (248) 443-1218)

PROOF OF SERVICE

I, the undersigned, hereby certify that on February 18th, 2021, I served all attorneys of record, with Defendant Northwest Neurology's Answer to Plaintiff's First Request for Production of Documents, by e-file.

/s/ Paschal Ukpabi

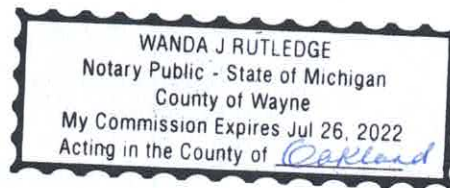
Dated: February 18th, 2021

Sworn before me, this 18th day of February, 2021. My Commission expires on

July 26, 2022

Wanda J Rutledge
Notary Public

Tessy Jenkins
Tessy Jenkins, MD
Affiant.



Tessy Chinyere Jenkins, M.D.

Objective

My interest in pursuing a medical degree was guided by an ardent desire to make a difference in people's lives by improving their health. Having achieved a specialty in Neurology and Clinical Neurophysiology, my ultimate wish is to utilize this as a tool to:

1. Facilitate the quality of medical care through effective treatment and health education for patients with neurological disease.
2. Identify resources for the improvement of health outcomes in minority populations with neurological disease, with a special focus on epilepsy.
3. Continue to contribute to academic excellence in the health system through effective student and resident education in partnership with the Detroit Medical Center and the Michigan State University.

Summary of Qualifications/Professional Activities

Clinical Neurologist (Adult Neurology)

Inpatient and outpatient care and consultation of neurology patients, including after-hours neurology calls.

Clinical Associate Professor of Neurology (MSUCOM)

Teaching and supervision of residents and students in clinical neurology rotations and clerkships.

Clinical Neurophysiologist

With Added Competency in Epilepsy Monitoring

Electroencephalography (EEG) studies via routine, video, and continuous ambulatory EEG monitoring.

Nerve conduction and Electromyography (EMG) studies.

Visual, Brainstem, and Somatosensory Evoked potential studies.

Autonomic testing, Transcranial Doppler Ultrasound (TCD) testing and Videonystagmography (VNG) studies.

Education

University of Jos, Nigeria

MB; BCH June 1984

Professional Experience

2004 – Present

President and Chief Neurologist

Northwest Neurology Clinic, PC

27200 Lahser Rd, Ste 100, Southfield, MI 48034

2015 – Present

Clinical Associate Professor

Department of Neurology and Ophthalmology

Michigan State University College of Osteopathic Medicine

2006 - 2010

Tessy Chinyere Jenkins, M.D.

Chief of Neurology
DMC/Sinai Grace Hospital
6071 W. Outer Dr, Detroit Mi 48235
(Stroke Champion for Advanced Primary Stroke Center certification 2009)

2003 - 2004

Staff Neurologist
Pointe Neurology
20160 Mack Ave, Grosse Pointe Woods MI 48236

1996 – 2003

Senior Staff Neurologist
Henry Ford Health System, Detroit, MI

1998 – 1999

Clinical Scholar
Resource Center on African American Aging Research in the Center for Medical Treatment Effectiveness for Diverse Populations (MEDTEP)

1986 - 1988

General Practitioner
PAMO Clinics and Hospitals, Nigeria.

1985 - 1986

Police Clinic, National Youth Service Corps

Clinical Training

1984 – 1985

Murtala Mohammed Hospital, Kano, Nigeria
House Officer/ Internship

1988 – 1989

Jos University Teaching Hospital, Nigeria
House Officer/ Anesthesiology

(October 1989 – June 1991
Relocation to USA & ECFMG exams)

1991 - 1992

Sinai Hospital, Detroit, MI
Internship/ Internal Medicine

July 1992 – October 1995

Henry Ford Hospital, Detroit, MI
Residency/ Neurology

November 1995 – October 1996

Tessy Chinyere Jenkins, M.D.

Henry Ford Hospital, Detroit, MI
Fellowship/ EEG-Epilepsy.

Board Certifications

American Board of Psychiatry and Neurology

- Neurology - Expiration 12/31/2020
- Clinical Neurophysiology – Expiration 12/31/2022

Professional Memberships

American Medical Association
American Academy of Neurology
National Medical Association

Awards

Diplomate, American Board of Psychiatry and Neurology (2020)
Diplomate, American Board of Clinical Neurophysiology (2022)
Certified, American Board of Disability Analysts
Resident Teaching Excellence Award, 1994
Best Student of the Year, 1977
Nigerian Government Academic Scholarship, 1973

Interests and Activities

Igbo Women Association of Michigan
Secretary 1996 – 1998
President 2011-2014

National Association of Resident Doctors (Jos Chapter)
Vice-president 1988 – 1989

Jos University Medical Students' Association
Vice-President 1982 –1983

Research Interests

Interventions to Improve Quality of Life in Older African Americans with Epilepsy
(Pilot Study 1998)

Languages

English, Igbo

STATE OF MICHIGAN
MICHIGAN DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BOARD OF MEDICINE

PHYSICIAN
LICENSE

TESSY CHINYERE JENKINS

LICENSE NO.
4301058568

EXPIRATION DATE
01/31/2021

4536970

THIS DOCUMENT IS DULY
ISSUED UNDER THE LAWS OF
THE STATE OF MICHIGAN.

STATE OF MICHIGAN
MICHIGAN DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BOARD OF PHARMACY
CONTROLLED SUBSTANCE LICENSE

*THIS LICENSE VALID ONLY IF PROFESSIONAL LICENSE IS ACTIVE

TESSY CHINYERE JENKINS

LICENSE NO.
4301058568

EXPIRATION DATE
01/31/2021

4536971

THIS DOCUMENT IS DULY
ISSUED UNDER THE LAWS OF
THE STATE OF MICHIGAN.

DEA REGISTRATION NUMBER	THIS REGISTRATION EXPIRES	FEE PAID
BJ5072575	12-31-2020	\$731

SCHEDULES	BUSINESS ACTIVITY	ISSUE DATE
2,2N,3 3N,4,5	PRACTITIONER	12-19-2017

JENKINS, TESSY CHINYERE MD
NORTHWEST NEUROLOGY CLINIC
27200 LAHSER RD.
SUITE 100
SOUTHFIELD, MI 48034

CONTROLLED SUBSTANCE REGISTRATION CERTIFICATE
UNITED STATES DEPARTMENT OF JUSTICE
DRUG ENFORCEMENT ADMINISTRATION
WASHINGTON D.C. 20537

Sections 304 and 1008 (21 USC 824 and 958) of the Controlled Substances Act of 1970, as amended, provide that the Attorney General may revoke or suspend a registration to manufacture, distribute, dispense, import or export a controlled substance.

THIS CERTIFICATE IS NOT TRANSFERABLE ON CHANGE OF OWNERSHIP, CONTROL, LOCATION, OR BUSINESS ACTIVITY, AND IT IS NOT VALID AFTER THE EXPIRATION DATE.

CONTROLLED SUBSTANCE REGISTRATION CERTIFICATE
UNITED STATES DEPARTMENT OF JUSTICE
DRUG ENFORCEMENT ADMINISTRATION
WASHINGTON D.C. 20537

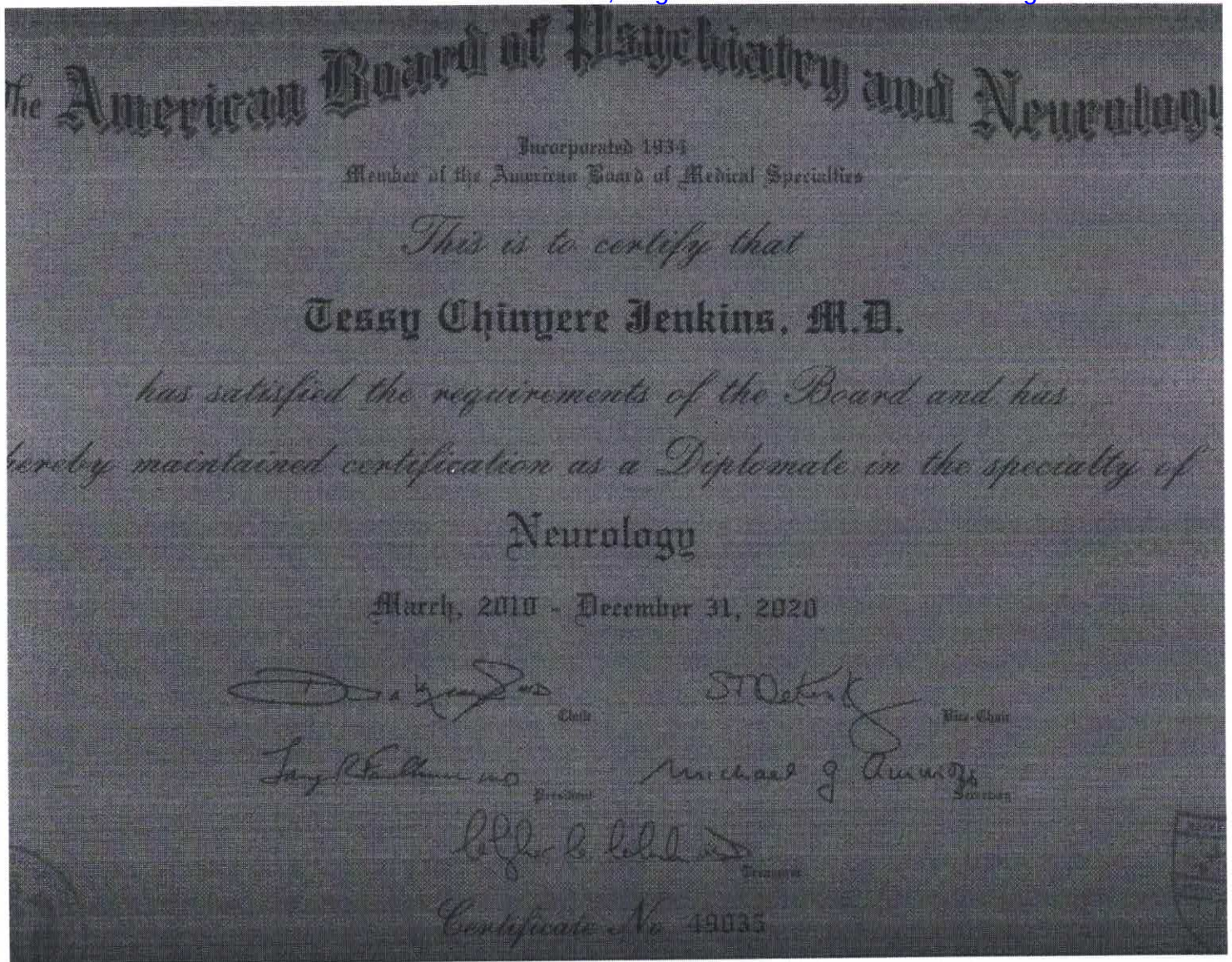
DEA REGISTRATION NUMBER	THIS REGISTRATION EXPIRES	FEE PAID
BJ5072575	12-31-2020	\$731

SCHEDULES	BUSINESS ACTIVITY	ISSUE DATE
2,2N,3 3N,4,5	PRACTITIONER	12-19-2017

JENKINS, TESSY CHINYERE MD
NORTHWEST NEUROLOGY CLINIC
27200 LAHSER RD.
SUITE 100
SOUTHFIELD, MI 48034

Sections 304 and 1008 (21 USC 824 and 958) of the Controlled Substances Act of 1970, as amended, provide that the Attorney General may revoke or suspend a registration to manufacture, distribute, dispense, import or export a controlled substance.

THIS CERTIFICATE IS NOT TRANSFERABLE ON CHANGE OF OWNERSHIP, CONTROL, LOCATION, OR BUSINESS ACTIVITY, AND IT IS NOT VALID AFTER THE EXPIRATION DATE.



American Board of Clinical Neurophysiology

SINCE 1946

This is to certify that

Tessy C. Jenkins, M.D.

Has satisfied the requirements of the Board and is hereby certified as a

DIPLOMATE

*in the specialty of Advanced Central Clinical Neurophysiology
with Added Competency in Epilepsy Monitoring*



William O. Fisher

President

[Signature]

Executive Director

December 31, 2022

[Signature]

BCS/CD-2300 (11/07)

MICHIGAN DEPARTMENT OF LABOR & ECONOMIC GROWTH
PROFIT CORPORATION INFORMATION UPDATE
2008



Due May 15, 2008

File Online at www.michigan.gov/fileonline

Identification Number 15805D	Corporation name NORTHWEST NEUROLOGY, P.C.
Resident agent name and mailing address of the registered office DR. TESSY JENKINS 17888 FARMINGTON RD LIVONIA MI 48152	
The address of the registered office 17888 FARMINGTON RD LIVONIA MI 48152	

If no change in the address of the registered office and/or resident agent proceed to Item 4.

1. Mailing address of registered office in Michigan (may be a P.O. Box) 21751 W. 11 Mile Rd. Ste 215 Southfield, MI 48076	2. Resident Agent
3. The address of the registered office in Michigan (a P.O. Box may not be designated as the address of the registered office) 21751 W. 11 Mile Rd. Ste 215 Southfield, MI 48076	
4. Describe the general nature and kind of business in which the corporation is engaged; Neurology Services	
5.	
NAME BUSINESS OR RESIDENCE ADDRESS	
President (Required) DR. TESSY JENKINS	21751 W. 11 Mile Rd Ste 215
Secretary (Required)	Southfield, MI 48076
Treasurer (Required)	
Vice-President	
Director	
Director	
Director	
6. Signature of authorized officer or agent [Signature]	Title President
	Date 7/1/08
	Phone (Optional)

Filing fee \$25

Report due May 15, 2008.

If received after May 15, penalty fees will be assessed.

(If more space is needed additional pages may be included. Do not staple any items to report. This report is required by Section 911, Act 284, Public Acts of 1977, as amended. Failure to file this report may result in the dissolution of the corporation. Late filing will result in penalty fees.)

Please make your check or money order payable to the State of Michigan.
Return to: Michigan Department of Labor & Economic Growth
Bureau of Commercial Services, Corporation Division
P.O. Box 30702
Lansing, MI 48909-0202
(517) 241-5470

Michigan Department of Labor & Economic Growth

Filing Endorsement

This is to Certify that the ANNUAL REPORT

for

NORTHWEST NEUROLOGY, P.C.

ID NUMBER: 15805D

received by facsimile transmission on July 1, 2008 is hereby endorsed

Filed on July 1, 2008 by the Administrator.

The document is effective on the date filed, unless a subsequent effective date within 90 days after received date is stated in the document.



In testimony whereof, I have hereunto set my hand and affixed the Seal of the Department, in the City of Lansing, this 1ST day of July, 2008.

, Director

Bureau of Commercial Services



Michigan Department of Labor & Economic Growth

Lansing, Michigan

This is to Certify That

NORTHWEST NEUROLOGY, P.C.

was validly incorporated on March 10, 2004, as a Michigan profit corporation, and said corporation is validly in existence under the laws of this state.

This certificate is issued pursuant to the provisions of 1972 PA 284, as amended, to attest to the fact that the corporation is in good standing in Michigan as of this date and is duly authorized to transact business and for no other purpose.

This certificate is in due form, made by me as the proper officer, and is entitled to have full faith and credit given it in every court and office within the United States.



Sent by Facsimile Transmission
15805D

In testimony whereof, I have hereunto set my hand, in the City of Lansing, this 01st day of July, 2008.

Andrew J. Hoff, Director

Bureau of Commercial Services

Evidence-Based Guideline Update: Intraoperative Spinal Monitoring with Somatosensory and Transcranial Electrical Motor Evoked Potentials*

Marc R. Nuwer,* Ronald G. Emerson,† Gloria Galloway,‡ Alan D. Legatt,§ Jaime Lopez,||
Robert Minahan,¶ Thoru Yamada,# Douglas S. Goodin,** Carmel Armon,††
Vinay Chaudhry,‡‡ Gary S. Gronseth,§§ and Cynthia L. Harden|||

Objective: To evaluate whether spinal cord intraoperative monitoring (IOM) with somatosensory and transcranial electrical motor evoked potentials (EPs) predict adverse surgical outcomes.

Methods: A panel of experts reviewed the results of a comprehensive literature search and identified published studies relevant to the clinical question. These studies were classified according to the evidence-based methodology of the American Academy of Neurology. Objective outcomes of postoperative onset of paraparesis, paraplegia, and quadriplegia were used because no randomized or masked studies were available.

Results and Recommendations: Four class I and eight class II studies met inclusion criteria for analysis. The four class I studies and seven of the eight class II studies reached significance in showing that paraparesis, paraplegia, and quadriplegia occurred in the IOM patients with EP changes compared with the IOM group without EP change. All studies were consistent in showing all occurrences of paraparesis, paraplegia, and quadriplegia in the IOM patients with EP changes, with no occurrences of paraparesis, paraplegia, and quadriplegia in patients without EP change. In the class I studies, 16% to 40% of the IOM patients with EP changes developed postoperative-onset paraparesis, paraplegia, or quadriplegia. IOM is established as effective to predict an increased risk of the adverse outcomes of paraparesis, paraplegia, and quadriplegia in spinal surgery (four class I and seven class II studies). Surgeons and other members of the operating team should be alerted to the increased risk of severe adverse neurologic outcomes in patients with important IOM changes (level A).

Key Words: Intraoperative monitoring, Somatosensory evoked potentials, Motor evoked potentials, Outcome studies, Spinal cord.

(*J Clin Neurophysiol* 2012;29: 101–108)

INTRODUCTION

Paraparesis, paraplegia, and quadriplegia are complications of spinal surgery and certain surgeries of the aorta. Intraoperative monitoring (IOM) of neural function is used to warn of the risk of surgical complications (Fehlings et al., 2010; Harner et al., 1987; Nuwer et al., 1995, 2008; Radtke et al., 1989; Sala et al., 2006). Anesthesiologists and surgeons are able to intervene in a variety of ways when IOM raises warnings. They can modify surgery by interventions such as reducing the degree of distraction, adjusting retractors, removing or adjusting grafts or hardware, reimplanting or unclamping arteries, placing vascular bypass grafts, minimizing the remaining portion of the surgery, or other actions. Surgeons also have the opportunity to check a wake-up test in some patients.

This evidence-based guideline seeks to answer the clinical question: Does IOM with somatosensory evoked potentials (SEP) and transcranial electrical motor evoked potentials (MEP) predict adverse surgical outcomes?

The panel addressed this question on the basis of subgroup analyses of well-defined patient cohorts, comparing the clinical outcomes of those patients who had evoked potential (EP) changes with those who had no EP changes. The panel recognized an inherent limitation in assessing the specificity of IOM changes when those changes resulted in clinical interventions by anesthesiologists or surgeons.

The panel applied the following reasoning:

1. If it can be shown that adverse IOM changes predict increased risk of adverse clinical outcomes consistently, then all adverse IOM changes may represent possible compromise of the spinal cord that might result in an adverse outcome.
2. Nonobjective outcomes are particularly problematic for assessing the usefulness of IOM because of the potential for diagnostic suspicion bias. Patients with abnormal IOM might be more thoroughly evaluated postoperatively than patients without intraoperative changes. Without masked outcome assessment and a standardized method of case ascertainment, only obvious outcomes (e.g., new paraplegia) are likely to be noticed in patients with normal IOM. Subtler changes, such as sensory changes, could easily be missed.

*Endorsed by the American Association of Neuromuscular and Electrodiagnostic Medicine on January 3, 2012.

From the *Department of Neurology, University of California Los Angeles School of Medicine, Los Angeles, CA; †Hospital for Special Surgery, New York, NY; ‡Departments of Neurology and Pediatrics, Nationwide Children's Hospital, Ohio State University, Columbus, OH; §Department of Neurology, Albert Einstein School of Medicine, Bronx, NY; ||Department of Neurology, Stanford University School of Medicine, Stanford, CA; ¶Department of Neurology, Georgetown University School of Medicine, Washington, DC; #Department of Neurology, University of Iowa School of Medicine, Iowa City, IA; **Department of Neurology, University of California at San Francisco, San Francisco, CA; ††Division of Neurology, Tufts University School of Medicine & Baystate Medical Center, Springfield, MA; ‡‡Department of Neurology, Johns Hopkins School of Medicine, Baltimore, MD; §§Department of Neurology, University of Kansas School of Medicine, Kansas City, KS; and |||Department of Neurology, Hofstra North Shore-Long Island Jewish School of Medicine, New Hyde Park, NY.

Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and the American Clinical Neurophysiology Society.

Approved by the AAN Therapeutics and Technology Assessment Subcommittee on February 19, 2011; by the AAN Practice Committee on May 19, 2011; by the AAN Board of Directors on October 14, 2011; and by the ACNS Council on June 11, 2011.

Address correspondence and reprint requests to: American Academy of Neurology, 1080 Montreal Avenue, St. Paul, MN 55116; e-mail: guidelines@aan.com

Copyright © 2012 by the American Clinical Neurophysiology Society
ISSN: 0736-0258/12/2901-0101

This bias would tend to exaggerate the usefulness of IOM. Therefore, the only outcomes assessed were new paraparesis, paraplegia, and quadriplegia, as these neurologic deficits are more objective signs than are less-severe deficits.

DESCRIPTION OF THE ANALYTIC PROCESS

Seven physician clinical neurophysiologists were appointed to write this guideline (MN, RE, GG, AL, JL, RM, TY) because of their expertise in spinal IOM. The panel members were appointed jointly by the Therapeutics and Technology Assessment Subcommittee (see appendixes 1 and 2) of the American Academy of Neurology (AAN) and the American Clinical Neurophysiology Society (ACNS). Five additional panel members (DG, CA, VC, GG, CH) served as methodology experts.

A research librarian performed literature searches of MEDLINE and EMBASE databases using the following keywords: "monitoring," "intraoperative," "evoked potentials," "paralysis," and "intraoperative complications." Additional articles were found from among the references cited in the reports reviewed. Each article was reviewed independently by at least two panel members. Appendix 3 presents the complete MEDLINE search strategy, and appendix 4 presents the complete EMBASE search strategy.

The panel elected to focus on the two most common current spinal cord IOM techniques. The SEP technique evaluated was ankle-wrist stimulation with neck-scalp recording. The MEP technique evaluated was transcranial electrical MEP with muscle recording.

Minimum size for study inclusion was 100 patients for orthopedic procedures and 20 patients for neurosurgical or cardiothoracic procedures. Different numbers were used because the rates of adverse neurologic outcomes are lower for orthopedic spine procedures compared with neurosurgical and cardiothoracic procedures.

A study was included if it represented a consecutive series of a representative group of patients, preferably prospective; if the IOM followed a protocol established in advance; if the IOM changes were identified in real time, before outcomes were known; and if the clinical outcomes of interest (paraparesis, paraplegia, and quadriplegia) were clearly reported. Reports were reviewed and scored independently by all content expert panelists. Those panelists discussed and resolved by consensus the methodology, results, relevance, and conclusions for a few reports for which there was initial panel discrepancy.

Next, these articles were rated using the AAN four-tiered (class I to class IV) classification of evidence scheme for rating diagnostic studies (appendix 5), and conclusions and recommendations were linked to the strength of the evidence (appendix 6). All articles that were rated class I or class II are listed in Table 1. The primary data evaluated were the results from a comparison of the group without EP changes with the group with EP changes in both the number of cases with new postoperative paraparesis, paraplegia, and quadriplegia and the number without these conditions. Descriptive statistics and Fisher's exact test were used for statistical analysis.

ANALYSIS OF EVIDENCE

The search identified an initial set of 604 reports. Of those, 40 articles met inclusion criteria, but 28 were subsequently excluded because they contained class III or IV data; did not address the outcomes of paraparesis, paraplegia, or quadriplegia; primarily

assessed nerve roots instead of the spinal cord; or substantially relied on techniques beyond the scope of this guideline.

Twelve studies (Costa et al., 2007; Cunningham et al., 1987; Etz et al., 2006; Hilibrand et al., 2004; Jacobs et al., 2000; Khan et al., 2006; Langeloo et al., 2003; Lee et al., 2006; May et al., 1996; Pelosi et al., 2002; Sutter et al., 2007; Weinzierl et al., 2007) provide evidence to assess the role of IOM in the prediction of adverse outcomes (Table 1), four of which were class I (Costa et al., 2007; Cunningham et al., 1987; Sutter et al., 2007; Weinzierl et al., 2007). One class I study (Cunningham et al., 1987) found that no events of paraparesis, paraplegia, or quadriplegia occurred in 17 IOM patients without EP changes, but five of these adverse events occurred in 16 IOM patients with EP changes (31%) (Fisher's exact test, $P = 0.0184$). In the second class I study (Sutter et al., 2007), no events of paraparesis, paraplegia, or quadriplegia occurred in 84 IOM patients without EP changes, but among 25 IOM patients with EP changes, four (16%) had adverse outcomes: one had paraplegia, one had quadriplegia, and two had worsening of preexisting paraparesis (Fisher's exact test, $P = 0.00369$). In the third class I study (Costa et al., 2007), no events of paraparesis, paraplegia, or quadriplegia occurred in 45 IOM patients without EP changes, but two adverse events occurred in five IOM patients with EP changes (40%) (Fisher's exact test, $P = 0.0158$). In the fourth class I study (Weinzierl et al., 2007), no events of paraparesis, paraplegia, or quadriplegia occurred in 49 IOM patients without EP changes, but eight adverse events occurred in 20 IOM patients with EP changes (40%) (Fisher's exact test, $P = 0.000148$). Overall, events of paraparesis, paraplegia, or quadriplegia occurred in 16% to 40% of IOM patients with EP changes, but no adverse outcome events occurred in patients without an EP change.

The other eight articles were class II (Etz et al., 2006; Hilibrand et al., 2004; Jacobs et al., 2000; Khan et al., 2006; Langeloo et al., 2003; Lee et al., 2006; May et al., 1996; Pelosi et al., 2002). No events of paraparesis, paraplegia, or quadriplegia occurred in 108 of 1378 IOM patients without EP changes, whereas these severe adverse outcome events occurred in 1% to 100% in the 1 to 72 IOM patients with EP changes. Seven of these studies reached significance by Fisher's exact test ($P < 0.05$) (Etz et al., 2006; Hilibrand et al., 2004; Jacobs et al., 2000; Khan et al., 2006; Lee et al., 2006; May et al., 1996; Pelosi et al., 2002).

All studies were consistent in that all paraparesis, paraplegia, and quadriplegia events occurred in the IOM patients with EP changes, and none occurred in the IOM patients without EP changes.

This assessment did not undertake to evaluate lesser degrees of motor impairment, which would underestimate the overall adverse outcome rate. It did not assess radiculopathy or similar complications of lumbar fusion.

The one prospective comparative study (Sala et al., 2006) of motor outcomes in patients with IOM *versus* those without IOM was excluded from this assessment because it used graded motor power changes rather than the presence of paraparesis, paraplegia, and quadriplegia as its outcome measure. That cohort study measured motor outcome and the decision to monitor, not whether the monitoring showed intraoperative changes. The study showed a significant positive relationship between decision to monitor and better motor outcome.

CONCLUSION

IOM is established as effective to predict an increased risk of the adverse outcomes of paraparesis, paraplegia, and quadriplegia in spinal surgery (four class I and seven class II studies).

TABLE 1. Summary of Evidence

Reference	Methods: Study design, number of patients, type of surgery, definition of intraoperative EP abnormality	Results	Class of Evidence
Pelosi et al., 2002	126 consecutive spinal orthopedic operations in 97 patients: 79 spinal deformity and 18 other spinal procedures Preoperative deficits 76 intact and 21 with deficits SEP criteria for change: $\geq 50\%$ amplitude decrease or $\geq 10\%$ latency increase MEP criteria for change: (a) during propofol maintenance anesthesia $\geq 50\%$ amplitude drop; (b) otherwise loss of response on 2 consecutive trials	EP monitoring in 124 operations in 95 patients, orthopedic spinal surgery SEP in 122, MEP in 106 EP summary (n = 124) No EP changes: 0/108 Yes EP changes: 1/16 (6.3%) Fisher's exact test: $P = 0.129$ (NS)	II
Hilibrand et al., 2004	Retrospective cohort study reviewing 427 consecutive cervical spine procedures EP criterion of change: $> 60\%$ amplitude decrease for ≥ 10 mins	SEP and MEP monitoring in 427 patients during cervical spine surgery EP summary (n = 427) No EP change: 0/415 Yes EP change: 1/12 (8.3%) Fisher's exact test: $P = 0.0281$	II
Jacobs et al., 2000	210 consecutive patients undergoing thoracoabdominal aortic aneurysm repair CSF drainage used Abnormal MEP: reduction of MEP amplitude to $< 25\%$ of baseline	MEP monitoring during 210 cases of thoracoabdominal aortic aneurysm repair MEP summary (n = 210): No EP change: 0/138 Yes EP change: 5/72 (1.4%) Fisher's exact test: $P = 0.00541$	II
Langeloo et al., 2003	Descriptive historic cohort study 132 patients undergoing corrective surgery for spinal deformity MEP criterion of change: $> 80\%$ decrease in amplitude	MEP monitoring during 132 cases of correction of spinal deformity MEP summary (n = 132): No EP change: 0/116 Yes EP change: 1/16 (6.2%) Fisher's exact test: $P = 0.1212$ (NS) Three additional cases of limited leg weakness, each associated with EP changes, were not included here as paraparesis-paraplegia outcomes	II
Cunningham et al., 1987	33 consecutive patients undergoing surgical procedures for lesions of the descending thoracic or thoracoabdominal aorta prospectively evaluated SEP changes criteria of change: persistent EP loss	SEP monitoring in 33 procedures on descending thoracic or thoracoabdominal aorta SEP summary (n = 33): No EP change: 0/17 Yes EP change: 5/16 (31%) Fisher's exact test: $P = 0.0184$	I
May et al., 1996	191 patients undergoing cervical spine procedures Median SEP monitored in all cases; ulnar and/or posterior tibial SEP in 12 cases SEP criterion for change: $> 50\%$ amplitude reduction in N20, occurring suddenly, persisting, without attributable anesthetic or systemic cause	SEP monitoring of upper-limb responses in 182 procedures SEP summary (n = 182): No EP change: 0/149 Yes EP change: 2/33 (6.0%) Fisher's exact test: $P = 0.032$	II
Khan et al., 2006	Retrospective review for 508 patients who underwent anterior cervical fusion with single-level or multilevel corpectomies EP change criteria: $> 50\%$ amplitude decrease or $> 10\%$ latency increase Masking: Motor outcome determined without knowledge of EP changes	SEP monitoring in 508 cases of cervical spine corpectomy surgery SEP summary (n = 508): No EP change: 0/481 Yes EP change: 1/27 (3.7%) Fisher's exact test: $P = 0.032$	II

TABLE 1. (Continued)

Reference	Methods: Study design, number of patients, type of surgery, definition of intraoperative EP abnormality	Results	Class of Evidence
Lee et al., 2006	Retrospective review of 1445 patients who underwent anterior cervical discectomy or corpectomy 573 single-level ACDFs, 375 multilevel ACDFs, 497 corpectomies Criterion for change: $\geq 60\%$ amplitude decrease persisting at least 10 mins	MEP and SEP monitoring in 1445 cases of anterior cervical surgery EP summary (n = 1445) No EP change: 0/1378 Yes EP change: 1/67 (1.5%) Fisher's exact test: $P=0.0464$	II
Weinzierl et al., 2007	Prospective study of EP intraoperative monitoring in 69 consecutive neurosurgical operations Criterion for EP change: $>50\%$ decrease in amplitude or $>10\%$ latency increase	SEP and MEP monitoring in 69 procedures EP summary (n = 69): No EP change: 0/49 Yes EP change: 8/20 (40%) Fisher's exact test: $P = 0.000148$ Excluded from postop motor deficits in patients with EP changes: 1 transient ataxic gait, 1 transient hypoesthesia	I
Costa et al., 2007	Prospective study of 52 patients during spine surgery for trauma, tumor resection, spondylosis, scoliosis, spinal vascular anomaly, dorsal cysts SEP with MEP monitoring in 38 patients MEP alone in 12 patients Criterion for change: $>50\%$ SEP or $>60\%$ MEP amplitude decrease	SEP and MEP monitoring in 50 cases of spine and spinal cord surgery EP summary (n = 50): No EP change: 0/45 Yes EP change: 2/5 (40%) Fisher's exact test: $P = 0.0158$ Deficits included 1 new paraplegia and 1 worsening of preoperative paraparesis	I
Sutter et al., 2007	Prospective study of 109 consecutive patients for whom monitoring was performed during spinal tumor surgery: 23 intramedullary, 41 intradural-extramedullary, 45 epidural Surgical intervention included systemic steroid, local hypothermia, and other interventions Criteria for EP change: $>50\%$ decrease in amplitude or $>10\%$ latency increase	SEP and MEP monitoring in 109 patients with spinal tumors EP summary (n = 109): No EP change: 0/84 Yes EP change: 4/25 (16%) Fisher's exact test: $P = 0.00369$ Adverse outcomes included 1 paraplegia, 1 quadriplegia, and 2 worsening of preexisting paraparesis	I
Etz et al., 2006	Retrospective review of 100 patients during thoracic and thoracoabdominal aortic aneurysm repair involving serial segmental artery sacrifice Criteria for EP change: $>50\%$ decrease in amplitude or $>10\%$ latency increase	MEP and SEP monitoring in 100 patients during aorta repair involving serial segmental artery sacrifice MEP and SEP summary (n = 100): No EP change: 0/99 Yes EP change: 1/1 (100%) Fisher's exact test: $P = 0.0198$ Excludes one paraplegia with an onset after a postoperative respiratory arrest	II

No EP change, number of new adverse postoperative motor outcomes among the cases with no EP changes/all cases with no changes; Yes EP change, number of new adverse postoperative motor outcomes among the cases with EP changes/all cases with EP changes (percent of adverse outcomes when EPs change); MEP, motor evoked potential; SEP, somatosensory evoked potential; EP, evoked potential; ACDF, anterior cervical discectomy and fusion.

RECOMMENDATION

Surgeons and other members of the operating team should be alerted to the increased risk of severe adverse neurologic outcomes in patients with important IOM changes (level A).

CLINICAL CONTEXT

In practice, after being alerted to IOM changes, the operating team intervenes to attempt to reduce the risk of adverse neurologic outcomes. No studies in humans have directly

measured the efficacy of such interventions. However, multiple controlled studies in animals (Bennett, 1983; Cheng et al., 1984; Coles et al., 1982; Kojima et al., 1979; Laschinger et al., 1982; Nordwall et al., 1979) have demonstrated that intervening after IOM alerts (as opposed to not intervening) reduces the risk of permanent neurologic injury. On this basis, it seems reasonable to assume that such interventions might improve outcomes in humans as well. It is unlikely that controlled human studies designed to determine the efficacy of post-IOM alert interventions will ever be performed.

This analysis did not compare MEP with SEP. The two techniques differ slightly. MEP more directly monitors the motor pathway itself. One technique may change while the other remains stable, or one may change earlier than the other. MEP requires more restrictive anesthesia requirements, causes patient movement, and has less-clear criteria for raising an alarm. SEP can localize an injury or site of ischemia more exactly. The transcranial electrical MEPs are often used intermittently because of movements that occur with the stimulus. Sometimes one technique can be accomplished throughout a case, whereas the other techniques cannot. As a result, it may be most appropriate for the surgeon, anesthesiologist, and neurophysiologic monitoring team to choose which technique(s) are most appropriate for an individual patient. Conducting both techniques together is a reasonable choice for many patients. Neither technique can predict the onset of paraplegia that is delayed until hours or days after the end of surgery. Neither technique should be considered to have perfect predictive ability when no EP change is seen; rare false-negative monitoring has occurred (Nuwer et al., 1995, 2008).

The studies reported here varied somewhat in the criteria used to raise alerts. The specific criteria used are reported in Table 1.

These IOM studies involved a knowledgeable professional clinical neurophysiologist supervisor. These studies support performance of IOM when conducted under the supervision of a clinical neurophysiologist experienced with IOM (American Medical Association, 2006, 2008; Nuwer et al., 1995). IOM conducted by technicians alone or by an automated device is not supported by the studies reported here because these studies did not use that practice model and because there is a lack of identified well-designed published outcome studies demonstrating efficacy with those practice models.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. Pooling of results from a large series of well-monitored patients may permit determination if the low false-negative frequency for MEP IOM in the reported studies is a generalizable observation.
2. A better understanding of anterior spinal artery syndrome may help to reduce further the rate of paraplegia and paraparesis after spinal surgery.
3. If limitations in the techniques reviewed can be identified explicitly and methods to correct those limitations are developed, then comparisons among different monitoring techniques may be desirable.

AUTHOR CONTRIBUTIONS

Dr. Nuwer: drafting/revising the manuscript, study concept or design, analysis or interpretation of data, statistical analysis. Dr. Emerson: drafting/revising the manuscript, analysis or interpretation of data, statistical analysis. Dr. Galloway: drafting/revising the manuscript, study concept or design, analysis or interpretation of data. Dr. Legatt: drafting/revising the manuscript, analysis or interpretation of data. Dr. Lopez: drafting/revising the manuscript, study concept or design, analysis or interpretation of data, acquisition of data. Dr. Minahan: drafting/revising the manuscript, study concept or design, analysis or interpretation of data. Dr. Yamada: drafting/revising the manuscript, contribution of vital reagents/tools/patients, acquisition of data, statistical analysis. Dr. Goodin: drafting/revising the manuscript. Dr. Armon: drafting/revising the manuscript, study concept or design, analysis or interpretation of data. Dr. Chaudhry: drafting/revising the manuscript, analysis or

interpretation of data. Dr. Gronseth: drafting/revising the manuscript, analysis or interpretation of data, statistical analysis. Dr. Harden: drafting/revising the manuscript, statistical analysis.

DISCLOSURES

Dr. Nuwer estimates that 20% of his clinical effort is spent on intraoperative spinal cord monitoring; serves on a scientific advisory board for Corticare; serves on editorial advisory boards for *Clinical Neurophysiology*, *Journal of Clinical Neurophysiology*, *Practical Neurology*, and *Medical Economics*; receives publishing royalties for *Intraoperative Neurophysiologic Monitoring* (Cambridge University Press, 2010); serves as a consultant for Mattel; serves as Local Medical Director for SleepMed-Digitrace; receives research support from Bristol-Myers Squibb; holds stock in Corticare; and has provided depositions and expert testimony in medicolegal cases. Dr. Emerson has filed patents regarding Dynamic adjustable spatial granularity for EEG display and systems and methods for measuring brain activity; serves as a consultant for Persyst Development Corporation; estimates that 85% of his clinical effort is spent on intraoperative monitoring; and receives research support from Cyberkinetics Neurotechnology Systems Inc., the National Institutes of Health, NYS SCIRB, and the Epilepsy Foundation. Dr. Galloway estimates that 60% of her clinical effort is spent on intraoperative monitoring. Dr. Legatt serves on the editorial board of the *Journal of Clinical Neurophysiology*; holds equity in Entremed, Pfizer Inc, Teva Pharmaceutical Industries Ltd., GlaxoSmithKline, Johnson & Johnson, Schering-Plough Corp., GE Healthcare, and Proctor & Gamble; estimates that 65% of his clinical effort is spent on intraoperative monitoring; and has provided expert testimony in medicolegal cases. Dr. Lopez has received funding for travel from Cadwell Laboratories, Inc.; receives publishing royalties for *Intraoperative Neurophysiologic Monitoring* (Cambridge University Press, 2010); estimates that 60% of his clinical effort is spent on intraoperative monitoring; and has provided expert testimony in medicolegal cases. Dr. Minahan estimates that 60% of his clinical effort is spent on intraoperative monitoring and has provided expert testimony in medicolegal cases. Dr. Yamada estimates that 10% of his clinical effort is spent on intraoperative monitoring; serves on the editorial board of the *Journal of Clinical Neurophysiology*; and receives publishing royalties for *Practical Guide for Clinical Neurophysiologic Testing: EEG* (Wolters Kluwer/Lippincott Williams & Wilkins, 2010) and *Practical Guide for Clinical Neurophysiologic Testing: EP, LTM, IOM, PSFG and NCS* (Wolters Kluwer/Lippincott Williams & Wilkins, 2011). Dr. Goodin has served on scientific advisory boards for Bayer Schering Pharma and Merck Serono; has received funding for travel and honoraria for speaking and consulting from Bayer Schering Pharma, Teva Pharmaceutical Industries Ltd., Novartis, and Merck Serono; has received speaker honoraria from Bayer Schering Pharma; has received research support from Bayer Schering Pharma and Novartis; has served as an expert witness in medicolegal cases; and holds equity interest in Teva Pharmaceutical Industries Ltd. and Biogen Idec. Dr. Armon has served on a scientific advisory board for Avanir Pharmaceuticals; serves on the editorial boards of *Neurology* and *emedicine Neurology*; has received honoraria from Medscape Today; receives publishing royalties from emedicine.com for updating electronic chapters and from UpToDate; has received research support from Avanir Pharmaceuticals, Schwartz Biomedical, LLC, the National Institutes of Health, and the Swiss PFO-Consortium; and has served as an expert witness in medicolegal cases. Dr. Chaudhry serves on the editorial board of *Neurologist*; is an inventor on patent(s) regarding Total Neuropathy Score (TNS)—a score for evaluating

peripheral neuropathies, for which he receives technology royalties from Abbott, Johnson & Johnson, and Sanofi-Aventis; receives publishing royalties for *Harrison's Principles of Internal Medicine, 17th edition* (McGraw Hill Companies, Inc., 2008); estimates that 40% of his clinical effort is spent on nerve conduction studies; has given expert testimony for the Department of Health and Human Services Vaccine Injury Compensation program; and receives research support from the Neuropathy Association and Nutricia. Dr. Gronseth serves as an editorial advisory board member of *Neurology Now*; serves on a speakers' bureau for Boehringer Ingelheim; and receives honoraria from Boehringer Ingelheim and the American Academy of Neurology. Dr. Harden serves on a scientific advisory board for Upsher-Smith Laboratories, Inc.; serves on speakers' bureaus for and has received speaker honoraria from Glaxo-SmithKline, UCB, and Lundbeck, Inc.; serves on the editorial boards of *Epilepsy Currents* and *Epilepsy Research*; receives publishing royalties from UpToDate, Inc.; and receives research support from Forest Laboratories, Inc., the Epilepsy Foundation, and the Milken Family Foundation.

Funding and Support

This evidence-based guideline was funded by the American Academy of Neurology and the American Clinical Neurophysiology Society. No author received honoraria or financial support to develop this document.

APPENDIX 1

Therapeutics and Technology Assessment Subcommittee Members 2009-2011

Janis M. Miyasaki, MD, MEd, FAAN (Co-Chair); Cynthia L. Harden, MD (Co-Chair); Richard M. Camicioli, MD; Terry D. Fife, MD, FAAN; Jonathan Hosey, MD, FAAN (Ex-Officio); Cheryl Jaigobin, MD; Barbara S. Koppel, MD, FAAN; Jason Lazarou, MD; Alexander Rae-Grant, MD; William H. Theodore, MD, FAAN.

APPENDIX 2

Mission Statement of the Therapeutics and Technology Assessment Subcommittee

The Therapeutics and Technology Assessment Subcommittee provides rigorous, relevant, timely evidence-based reviews of new, emerging, or established therapeutic agents and technologies in the field of neurology.

APPENDIX 3

Complete MEDLINE Search Strategy

While the staff of HealthSearch makes every effort to ensure that the information gathered is accurate and up-to-date, HealthSearch disclaims any warranties regarding the accuracy or completeness of the information or its fitness for a particular purpose. HealthSearch provides information from public sources both in electronic and print formats and does not guarantee its accuracy, completeness, or reliability. The information provided is only for the use of the Client, and no liability is accepted by HealthSearch to third parties.

Database: Ovid MEDLINE(R) <1996 to April Week 3 2008>
Search Strategy

1. Monitoring, Intraoperative/ (7608)
2. exp Spinal Cord/ (22700)
3. 1 and 2 (254)
4. spinal cord monitor:mp. (94)

5. Evoked Potentials, Motor/ (3266)
6. (motor adj2 evoked adj2 response\$1).mp. (132)
7. Evoked Potentials, Somatosensory/ (3871)
8. (somatosensory adj2 evoked adj2 response\$1).mp. (114)
9. (intraoperative adj2 neurophysiology).tw. (15)
10. (intraoperative adj2 somatosensory adj2 monitoring).tw. (3)
11. (sep adj2 monitoring).tw. (62)
12. Scoliosis/ (3578)
13. exp Spinal Cord Neoplasms/ (2248)
14. (spinal adj2 tumor\$1).tw. (868)
15. Spinal Fractures/ (4738)
16. exp Spinal Cord Injuries/ (12944)
17. Arteriovenous Malformations/ (2152)
18. (spinal adj2 avm\$1).tw. (55)
19. scoliosis.tw. (3911)
20. Aortic Coarctation/ (1738)
21. exp Neurosurgical Procedures/ (41808)
22. Operating Rooms/ (2875)
23. exp surgical procedures, operative/ (757407)
24. (21 or 22 or 23) and 2 (3016)
25. (aortic adj2 coarctation).tw. (919)
26. 2 and 17 (148)
27. or/1,3,9-10 (7613)
28. or/12-16,18-20,24-26 (28543)
29. 27 and 28 (429)
30. or/4-8,11 (6853)
31. or/12-16,18-20,25-26 (26249)
32. or/21-23 (759245)
33. 30 and 31 and 32 (221)
34. 29 or 33 (507)
35. limit 34 to (humans and yr="2005 - 2008" and (case reports or clinical trial or comparative study or controlled clinical trial or evaluation studies or journal article or meta analysis or multicenter study or randomized controlled trial or research support, nih, extramural or research support, nih, intramural or research support, non us gov't or research support, us gov't, non phs or research support, us gov't, phs or twin study or validation studies)) (137)
36. limit 34 to (humans and yr="2005 - 2008" and (clinical conference or comment or congresses or editorial or letter or news or practice guideline or "review")) (32)
37. 35 not 36 (109)

APPENDIX 4

Complete EMBASE Search Strategy

While the staff of HealthSearch makes every effort to ensure that the information gathered is accurate and up-to-date, HealthSearch disclaims any warranties regarding the accuracy or completeness of the information or its fitness for a particular purpose. HealthSearch provides information from public sources both in electronic and print formats and does not guarantee its accuracy, completeness, or reliability. The information provided is only for the use of the Client, and no liability is accepted by HealthSearch to third parties.

Database: EMBASE <1980 to 2008 Week 17>
Search Strategy

1. patient monitoring/ (38294)
2. Spinal Cord/ (23301)
3. and/1-2 (94)
4. (spinal adj2 cord adj2 monitor:).mp. (395)

5. neurophysiology/ (11456)
6. and/1,5 (227)
7. (intraoperative adj2 neurophysiology).tw. (15)
8. (intraoperative adj2 somatosensory adj2 monitoring).tw. (6)
9. 1 or 3 or 4 or 6 or 7 or 8 (38561)
10. (sep adj2 monitoring).tw. (145)
11. evoked muscle response/ (3373)
12. (motor adj2 evoked adj2 potential\$1).mp. (2433)
13. exp evoked somatosensory response/ (27328)
14. (somatosensory adj2 evoked adj2 potential\$1).mp. (5097)
15. (motor adj2 evoked adj2 response\$1).tw. (230)
16. (somatosensory adj2 evoked adj2 response\$1).tw. (391)
17. 10 or 11 or 12 or 13 or 14 or 15 or 16 (31104)
18. exp Scoliosis/ (8532)
19. exp Spinal Cord Tumor/ (3992)
20. (spinal adj2 tumor\$1).tw. (1531)
21. scoliosis.tw. (6971)
22. exp Spine Fracture/ (9466)
23. (spin\$2 adj2 fracture\$1).tw. (1911)
24. (spin\$2 adj2 arteriovenous malformation\$1).tw. (274)
25. spin\$2 adj2 avm\$1).tw. (116)
26. exp Spinal Cord Injury/ (23472)
27. Aorta Coarctation/ (4065)
28. (aort\$2 adj2 coarctation).tw. (1607)
29. Arteriovenous Malformation/ (5510)
30. 2 and 29 (115)
31. 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 30 (50565)
32. neurosurgery/ (17898)
33. exp spinal cord surgery/ (12343)
34. dorsal rhizotomy/ (557)
35. 33 not 34 (11786)
36. exp spine surgery/ (23516)
37. exp Surgical Technique/ (467261)
38. operating room/ (5763)
39. 32 or 37 or 38 (484754)
40. 2 and 39 (684)
41. 35 or 36 or 40 (26474)
42. 9 and 31 (656)
43. 17 and 31 and 41 (281)
44. 42 or 43 (801)
45. limit 44 to (human and yr="2005 - 2008" and journal) (227)
46. limit 44 to (human and yr="2005 - 2008" and (book or conference paper or editorial or erratum or letter or note or proceeding or report or "review" or short survey)) (105)
47. 45 not 46 (122)

APPENDIX 5

Classification of Evidence for Diagnostic Accuracy

1. **Class I:** A cohort study with prospective data collection of a broad spectrum of persons with the suspected condition, using an acceptable reference standard for case definition. The diagnostic test is objective or performed and interpreted without knowledge of the patient's clinical status. Study results allow calculation of measures of diagnostic accuracy.
2. **Class II:** A case control study of a broad spectrum of persons with the condition established by an acceptable reference standard compared to a broad spectrum of controls or a cohort study where a broad spectrum of persons with the suspected condition where the data was collected

retrospectively. The diagnostic test is objective or performed and interpreted without knowledge of disease status. Study results allow calculation of measures of diagnostic accuracy.

3. **Class III:** A case control study or cohort study where either persons with the condition or controls are of a narrow spectrum. The condition is established by an acceptable reference standard. The reference standard and diagnostic test are objective or performed and interpreted by different observers. Study results allow calculation of measures of diagnostic accuracy.
4. **Class IV:** Studies not meeting class I, II, or III criteria, including consensus, expert opinion, or a case report.

APPENDIX 6

Classification of Recommendations

1. **A** = Established as effective, ineffective, or harmful (or established as useful/predictive or not useful/predictive) for the given condition in the specified population. (Level A rating requires at least two consistent class I studies. [In exceptional cases, one convincing class I study may suffice for an "A" recommendation if 1) all criteria are met, 2) the magnitude of effect is large {relative rate improved outcome >5, and the lower limit of the confidence interval is >2}].)
2. **B** = Probably effective, ineffective, or harmful (or probably useful/predictive or not useful/predictive) for the given condition in the specified population. (Level B rating requires at least one class I study or two consistent class II studies.)
3. **C** = Possibly effective, ineffective, or harmful (or possibly useful/predictive or not useful/predictive) for the given condition in the specified population. (Level C rating requires at least one class II study or two consistent class III studies.)
4. **U** = Data inadequate or conflicting; given current knowledge, treatment (test, predictor) is unproven.

Disclaimer

This statement is provided as an educational service of the AAN and ACNS. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods for care of a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodology. The AAN and ACNS recognize that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all of the circumstances involved. The clinical context section is made available to place the evidence-based guideline into perspective with current practice habits and challenges. No formal practice recommendation should be inferred.

Conflict of Interest

The AAN and ACNS are committed to producing independent, critical, and truthful clinical practice guidelines (CPGs). Significant efforts are made to minimize the potential for conflicts of interest to influence the recommendations of this CPG. To the

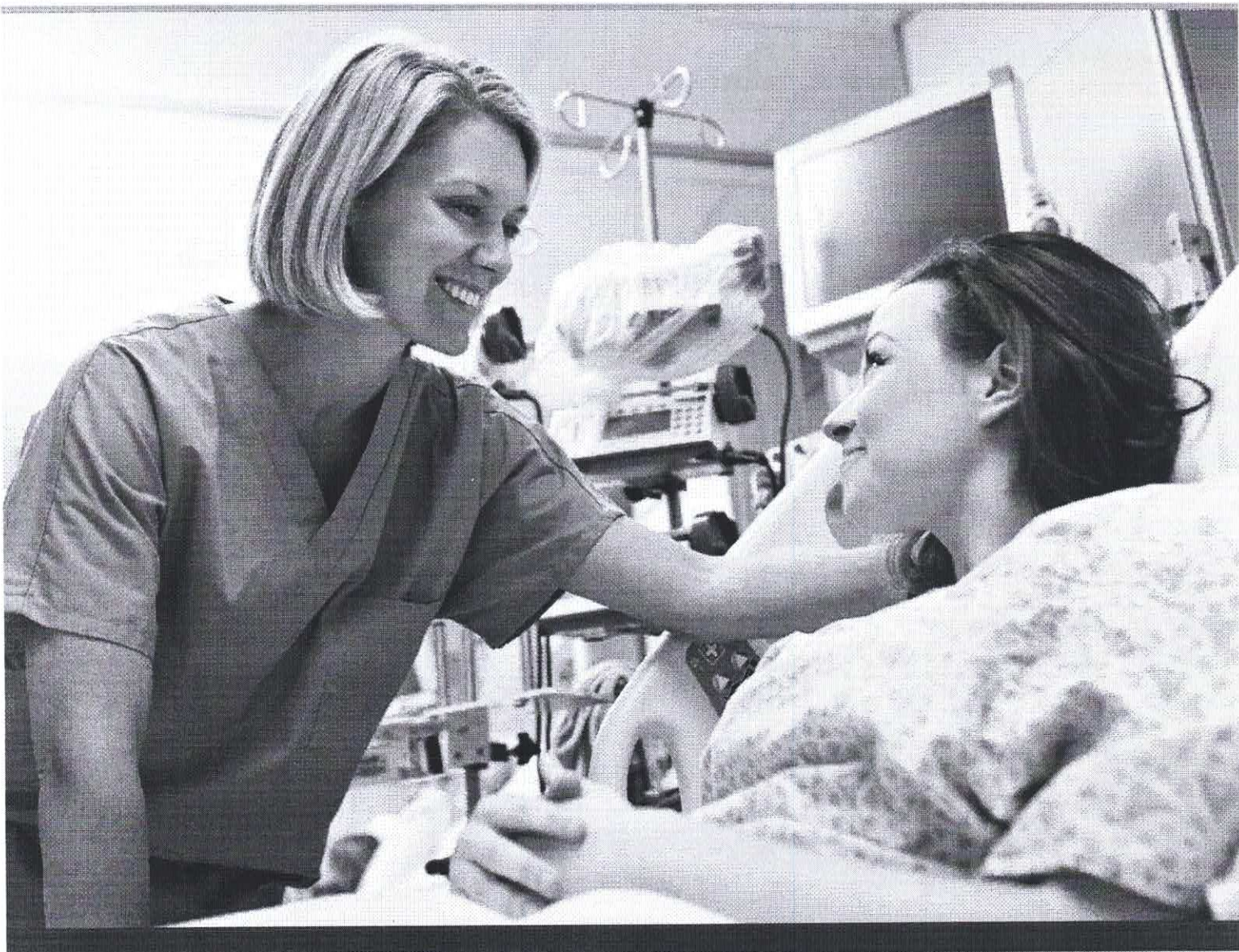
extent possible, the AAN and ACNS keep separate those who have a financial stake in the success or failure of the products appraised in the CPG and the developers of the guidelines. Conflicts of interest forms were obtained from all authors and reviewed by an oversight committee before project inception. AAN and ACNS limit the participation of authors with substantial conflict of interest. They forbid commercial participation in, or funding of, guidelines projects. Drafts of the guideline have been reviewed by at least three committees of the AAN and ACNS: a network of neurologists, *Neurology* peer reviewers, and representatives from related fields. The AAN Guideline Author Conflict of Interest Policy can be viewed at www.aan.com.

REFERENCES

- American Medical Association. Intraoperative Neurophysiologic Monitoring. Policy H-410.957. Adopted June 2008. Available at: <https://ssl3.ama-assn.org/apps/ecommerce/PolicyFinderForm.pl?site=www.ama-assn.org&uri=%2fresources%2fdoc%2fPolicyFinder%2fpolicyfiles%2fHnE%2fH-410.957.HTM>. Accessed February 1, 2010.
- American Medical Association. Diagnosis of Disease and Diagnostic Interpretation of Tests Constitutes Practice of Medicine to Be Performed by or Under the Supervision of Licensed Physicians. Policy H-35.971. Adopted December 2006. Available at: <https://ssl3.ama-assn.org/apps/ecommerce/PolicyFinderForm.pl?site=www.ama-assn.org&uri=%2fresources%2fdoc%2fPolicyFinder%2fpolicyfiles%2fHnE%2fH-35.971.HTM>. Accessed February 1, 2010.
- Bennett MH. Effects of compression and ischemia on spinal cord evoked potentials. *Exp Neurol* 1983;80:508–519.
- Cheng MK, Robertson C, Grossman RG, Foltz R, Williams V. Neurological outcome correlated with spinal evoked potentials in a spinal cord ischemia model. *J Neurosurg* 1984;60:786–795.
- Coles JG, Wilson GJ, Sima AF, Klement P, Tait GA. Intraoperative detection of spinal cord ischemia using somatosensory cortical evoked potentials during thoracic aortic occlusion. *Ann Thorac Surg* 1982;34:299–306.
- Costa P, Bruno A, Bonzanino M, et al. Somatosensory- and motor-evoked potential monitoring during spine and spinal cord surgery. *Spinal Cord* 2007;45:86–91.
- Cunningham JN Jr, Laschinger JC, Spencer FC. Monitoring of somatosensory evoked potentials during surgical procedures on the thoracoabdominal aorta. IV: Clinical observations and results. *J Thorac Cardiovasc Surg* 1987;94:275–285.
- Etz CD, Halsey JC, Spielvogel D, et al. Thoracic and thoracoabdominal aneurysm repair: Is reimplantation of spinal cord arteries a waste of time? *Ann Thorac Surg* 2006;82:1670–1678.
- Fehlings MG, Brodke DS, Norvell DC, Dettori JR. The evidence for intraoperative neurophysiological monitoring in spine surgery: Does it make a difference? *Spine* 2010;35:S37–S46.
- Harner SG, Daube JR, Ebersold MJ, Beatty CW. Improved preservation of facial nerve function with use of electrical monitoring during removal of acoustic neuromas. *Mayo Clin Proc* 1987;62:92–102.
- Hilibrand AS, Schwartz DM, Sethuraman V, Vaccaro AR, Albert TJ. Comparison of transcranial electrical motor and somatosensory evoked potential monitoring during cervical spine surgery. *J Bone Joint Surg* 2004;86A:1248–1253.
- Jacobs MJ, Elenbass TW, Schurink GWH, Mess WH, Mochtar B. Assessment of spinal cord integrity during thoracoabdominal aortic aneurysm repair. *Ann Thorac Surg* 2000;74:S1864–S1866.
- Khan MH, Smith PN, Balzer JB, et al. Intraoperative somatosensory evoked potential monitoring during cervical spine corpectomy surgery: Experience with 508 cases. *Spine* 2006;31:E105–E113.
- Kojima Y, Yamamoto T, Ogino H, Okada K, Ono K. Evoked spinal potentials as a monitor of spinal cord viability. *Spine* 1979;4:471–477.
- Langeloo DD, Lelivelt A, Journee L, Slappendel R, de Kleuver M. Transcranial electrical motor-evoked potential monitoring during surgery for spinal deformity: A study of 145 patients. *Spine* 2003;28:1043–1050.
- Laschinger JC, Cunningham JN Jr, Catinella FP, Nathan IM, Knopp EA, Spencer FC. Detection and prevention of intraoperative spinal cord ischemia after cross-clamping of the thoracic aorta: Use of somatosensory evoked potentials. *Surgery* 1982;92:1109–1117.
- Lee JY, Hilibrand AS, Lim MR, et al. Characterization of neurophysiologic alerts during anterior cervical spine surgery. *Spine* 2006;31:1916–1922.
- May DM, Jones SJ, Crookard HA. Somatosensory evoked potential monitoring in cervical surgery: Identification of pre- and post-operative risk factors associated with neurological deterioration. *J Neurosurg* 1996;85:566–573.
- Nordwall A, Axelgaard J, Harada Y, Valencia P, McNeal DR, Brown JC. Spinal cord monitoring using evoked potentials recorded from feline vertebral bone. *Spine* 1979;4:486–494.
- Nuwer MR. Intraoperative monitoring of neural function. In: Daube JR, Marguier F, eds. *Handbook of clinical neurophysiology*. Vol. 8. Amsterdam: Elsevier; 2008.
- Nuwer MR, Dawson EG, Carlson G, Kanim LEA, Sherman JE. Somatosensory evoked potential spinal cord monitoring reduces neurologic deficits after scoliosis surgery: Results of a large multicenter survey. *Electroencephalogr Clin Neurophysiol/Evoked Potentials Section* 1995;96:6–11.
- Pelosi L, Lamb J, Grevitt M, Mehdian SMH, Webb JK, Blumhardt LD. Combined monitoring of motor and somatosensory evoked potentials in orthopaedic spinal surgery. *Clin Neurophysiol* 2002;113:1082–1091.
- Radtke RA, Erwin CW, Wilkins RH. Intraoperative brainstem auditory evoked potentials: Significant decrease in postoperative morbidity. *Neurology* 1989;39:187–191.
- Sala F, Palandri G, Basso E, et al. Motor evoked potential monitoring improves outcome after surgery for intramedullary spinal cord tumors: A historical control study. *Neurosurgery* 2006;58:1129–1143.
- Sutter M, Eggspuehler A, Grob D, et al. The validity of multimodal intraoperative monitoring (MIOM) in surgery of 109 spine and spinal cord tumors. *Eur Spine J* 2007;16:S197–S208.
- Weinzierl MR, Reinacher P, Gilsbach JM, Rohde V. Combined motor and somatosensory evoked potentials for intraoperative monitoring: Intra- and post-operative data in a series of 69 operations. *Neurosurg Rev* 2007;30:109–116.

Cascade[®] **IONMAX**

CASCADE[®] **PRO**



WWW.CADWELL.COM

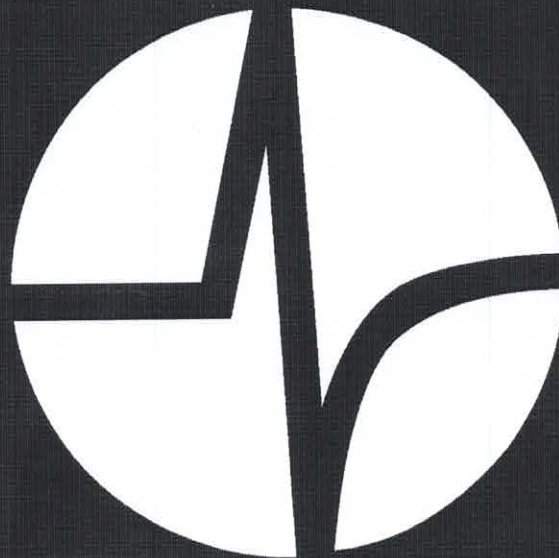
Surgeries are inherently risky, especially those that involve the brain, spinal cord or nerves. Intraoperative neurophysiological monitoring (IONM) is performed during many different types of surgeries to reduce the risk of devastating, irreversible neurological deficits, such as muscle weakness, loss of sensation, hearing loss, and impairment of essential bodily functions.

IONM involves multi-modal recording of electrical potentials from the nervous system during operations to detect adverse changes, enable corrective action, and offer surgical guidance.

CASCADE IONM SOLUTIONS,

time tested over two decades of innovation,
experience, and investment,

ARE THE FUTURE OF IONM.

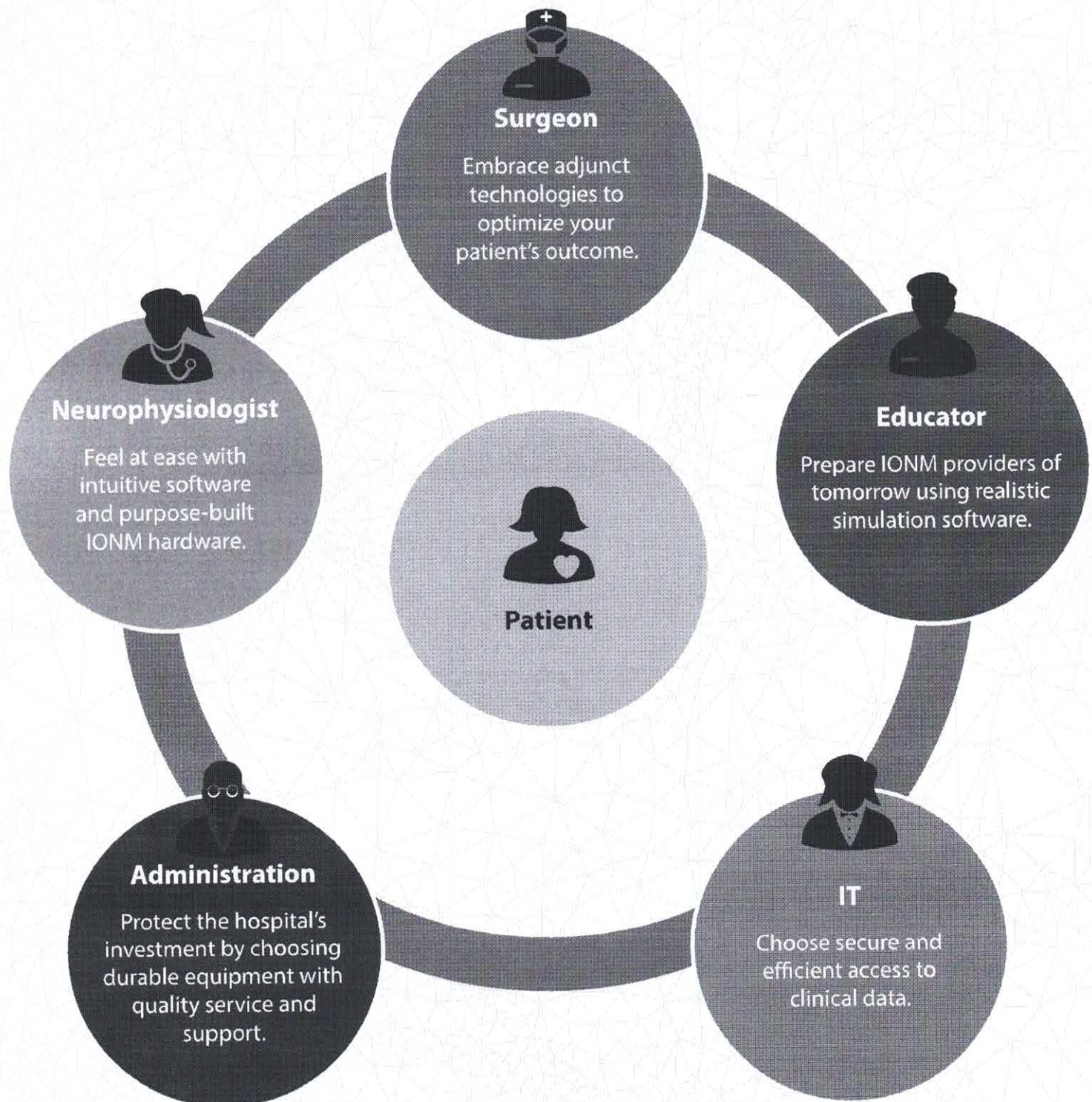


CADWELL®

Helping you help others

CASCADE IONM SOLUTIONS

Comprehensive solutions for patient-centered IONM care



Cascade IOMAX

The modular design of Cascade IOMAX lets users tailor each IONM setup to the specific requirements of each surgery.

Cortical Module. Designed for recording and stimulating at or near the patient's head, with 16 channels, TCS-9 for dynamic montaging of transcranial MEPs, and Low Current, Auditory and Visual Stimulation.

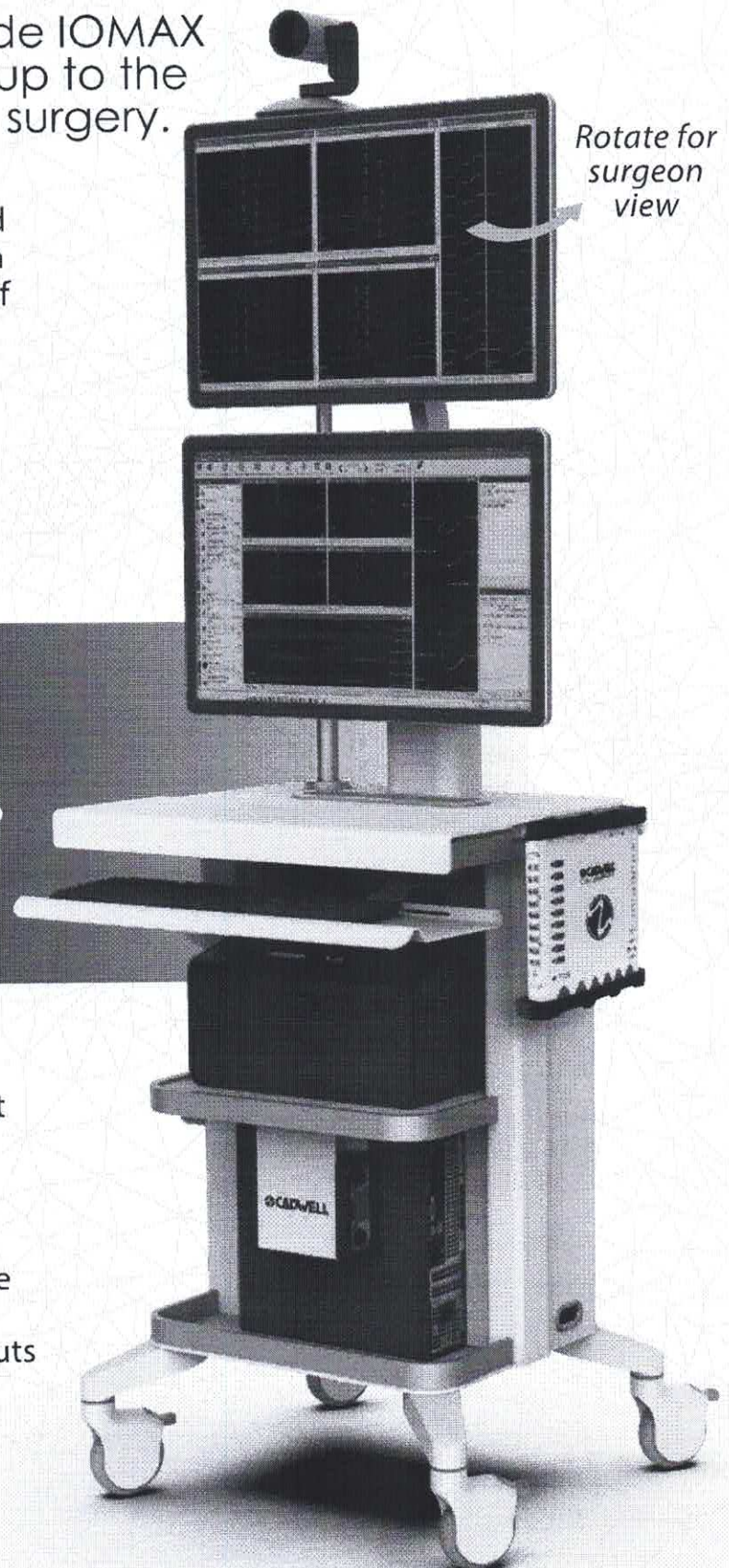
Limb Module. Designed for recording and stimulating the arms and legs with eight recording channels, 5 paired E-Stim outputs, SpO₂, and Heart Rate.

IOMAX systems are scalable from eight to 48 channels.

- Use the Cortical Module solo
- Combine the Cortical Module with one to four Limb Modules
- Use one or two Limb Modules independently

Base Module. Provides power and communication via a single SafeT™ Cable to the operating table, and allows Trigger In/Out interfacing with third-party devices.

LCSwap. Comprehensive switch matrix solution for direct cortical stimulation. Twelve outputs can be independently assigned as anode or cathode; includes two paired outputs for hand-held probes.





IONMAX is a compact and robust IONM system designed to withstand daily use and the environmental hazards of the operating room.

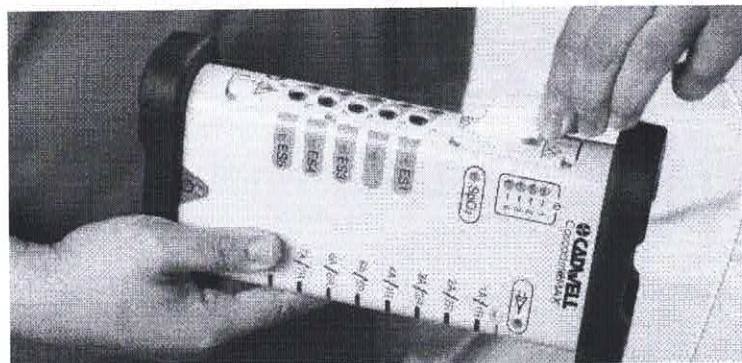
SafeT™ Cables
Waterproof,
quick-release,
and
completely
interchangeable.



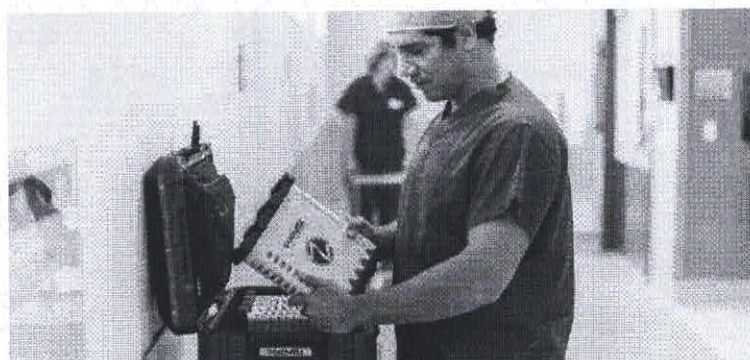
Cortical and
Limb Modules
are drop-tested
and waterproof.



Pelican™ case
Sturdy and
secure with
TSA-approved
lock.

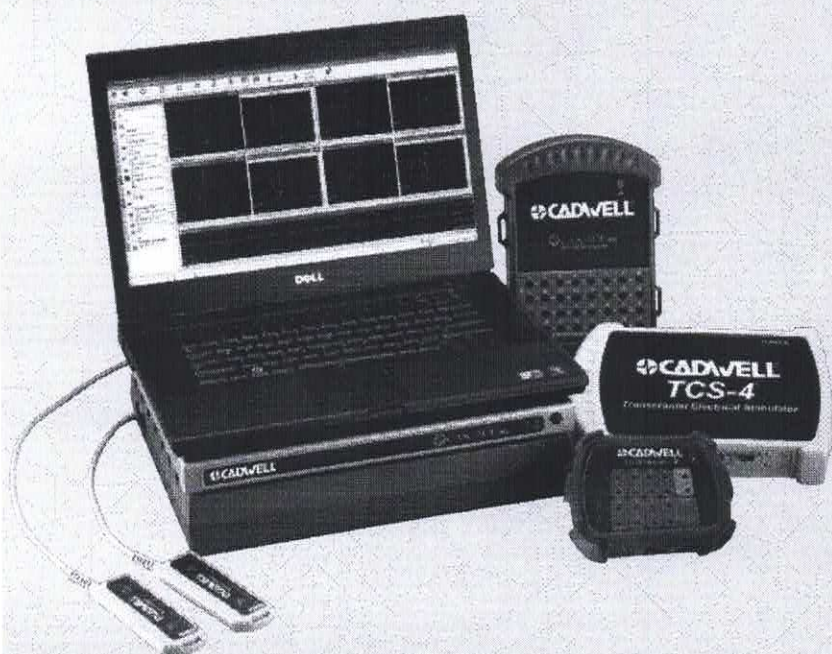


SpO₂
Measure pulse
oximetry and
heart rate from up
to four limbs.



Mount Modules
with operating
table rail
brackets and
clamps.

The pod-based design of the Cascade PRO is time-tested and user-approved for dynamic surgical environments.



Base Unit. All modality monitoring. Auditory and visual EP stimulation. Electrosurgery and noise detection.

Amplifiers. Choose 16 or 32 channels. Add input extender pods to reach the operating table.

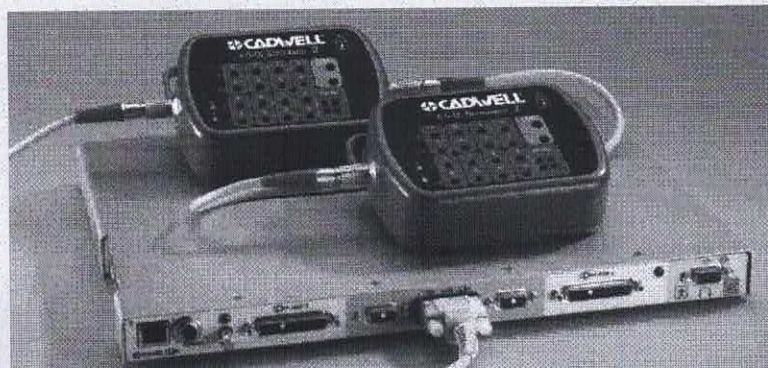
TCS-4 and TCS-1000. Transcranial motor stimulation with 1 or 4 fixed output pairs.

- Delivers high voltage, rapid trains of up to 9 pulses (at 1000V).
- With TCS-4, up to 4 sets of single anode to single cathode output combinations can be created and switched between in software.

ES-IX 2. High and low output stimulators are available for various applications, such as peripheral nerve and direct nerve stimulation.



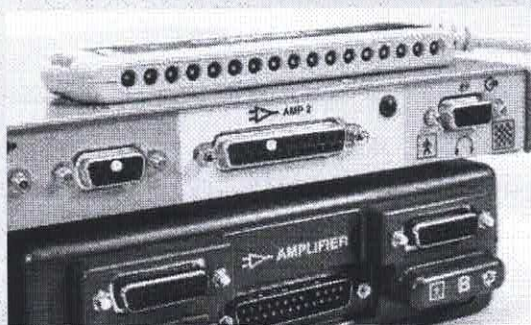
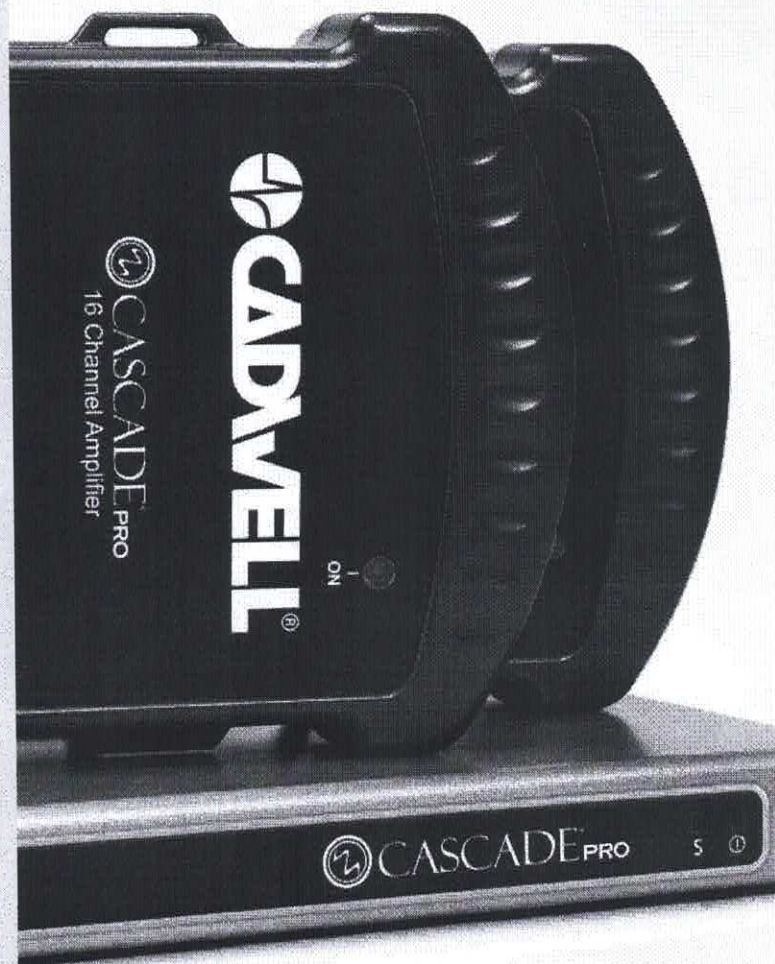
All-modality
monitoring with
16 or 32
channels.



Patented
quick-connect
cable fasteners
fast-track setup
and tear down.

Peripheral
stimulators
increase
case-by-case
flexibility.

Patented input
extender pod
cable shielding
reduces noise.

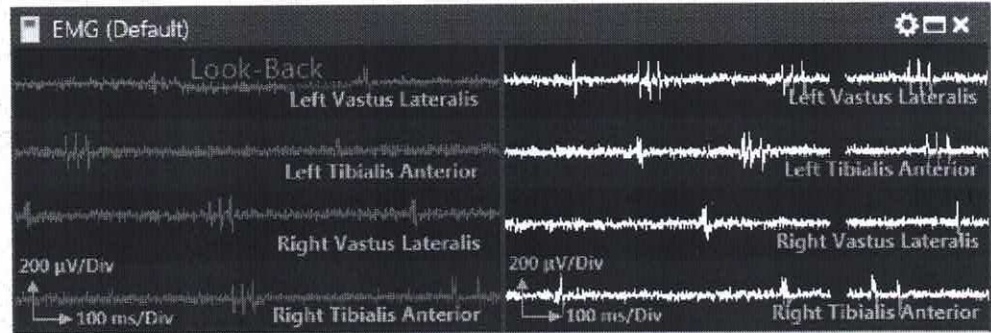


SURGICAL STUDIO

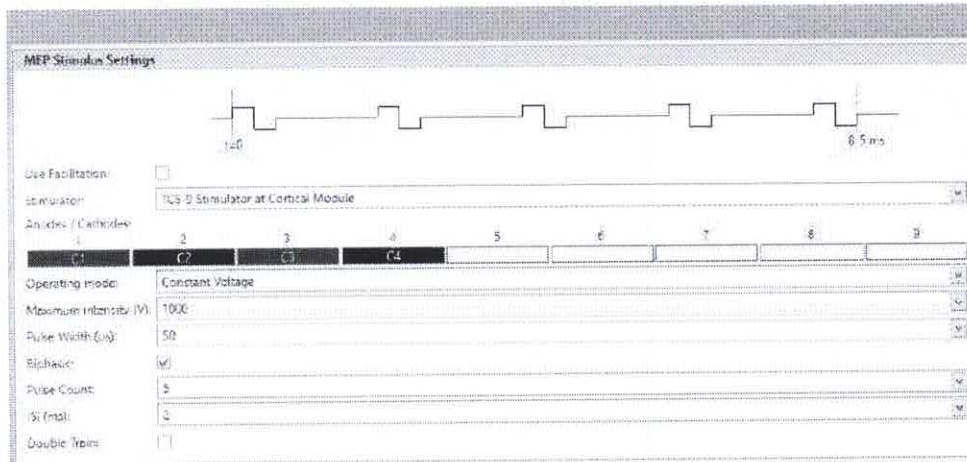
Cascade Surgical Studio software offers an intuitive interface that is compatible with all Cascade IONM systems.

Streamline your workflow

- Switch users during a case to log involvement and apply settings without interrupting data acquisition.
- Seamlessly share and manage data and resources across your organization.



View live and saved data side-by-side and never miss critical information.



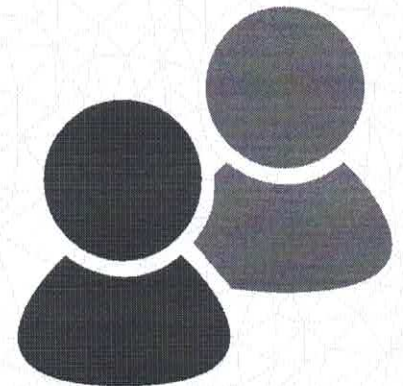
Use IOMAX TCS-9 dynamic montaging to achieve optimized MEP results for each patient.

Deliver clinical excellence

Achieve quick and intuitive direct cortical stimulation with strips, grids, and/or probes using the software-driven switch matrix.

Stay connected

- Remote monitoring and integrated group chat are powerful tools for communication with colleagues during surgery.
- Reviewers have their own display settings and the ability to add to the Event Log and capture screenshots.
- Set up CadLink™ information management to automatically interface with EMR or HIS to import patient demographics and export results and reports.



User Roles

Manage roles and permissions for all users.

User Roles	Selected User Role Permissions
Administrator	Allowed Permission Description
None	
Physician	
Tech	
	Accessibility If no options are selected, Users can always view their own records.
	<input checked="" type="checkbox"/> View All Records User can view all records, regardless of User Group assignment.
	<input checked="" type="checkbox"/> View My Group's Records User can view any records within their User Group.
	Administrative
	<input checked="" type="checkbox"/> Manage Body Sites User can create, edit and delete body sites.
	<input checked="" type="checkbox"/> Manage CadX Scripts User can create, edit, and delete CadX scripts.
	<input checked="" type="checkbox"/> Manage Custom Fields User can create, edit and delete custom fields.
	<input checked="" type="checkbox"/> Manage Mode Templates User can delete mode templates.
	<input checked="" type="checkbox"/> Manage Patients User can delete patients.
	<input checked="" type="checkbox"/> Manage Procedure Templates User can edit and delete procedure templates.
	<input checked="" type="checkbox"/> Manage Report Templates User can edit and delete report templates.
	<input checked="" type="checkbox"/> Manage Sitewide Settings User can manage settings for the entire site.
	<input checked="" type="checkbox"/> Manage System Settings User can edit system level settings.
	<input checked="" type="checkbox"/> Manage Users, User Roles, and User Groups User can create, edit and delete users, user roles, and user groups.
	<input checked="" type="checkbox"/> Preserve / Restore User can run the Preserve/Restore utility.
	Recording and Reviewing
	<input checked="" type="checkbox"/> Review Records User can review records.
	<input checked="" type="checkbox"/> Start Procedures User can start or append to a case.
	Record Management
	<input checked="" type="checkbox"/> Archive Management User can move archive locations and change edit/archive settings.
	<input checked="" type="checkbox"/> Archive Records User can archive records and restore records from the archive.
	<input checked="" type="checkbox"/> Delete Records User can delete records.
	<input checked="" type="checkbox"/> Export Records User can export records, case information, and case data.
	<input checked="" type="checkbox"/> Unlock Records User can remove all locks on a record.

Optimize quality management

- Standardize procedure setups.
- Control access to data and PHI.
- Demonstrate competency with CadX simulator.
- Automatically remove data from the local recording system with CadLink.
- Track case involvement and apply user preferences.

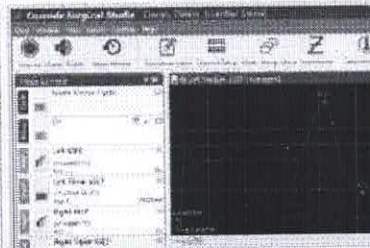
Set users permissions for recording, reviewing and data management.

Screenshots

Select Screenshots to Include:

Preview:

Include	Events
<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Incision
<input checked="" type="checkbox"/>	Screenshot
<input checked="" type="checkbox"/>	Exposure
<input checked="" type="checkbox"/>	SSEPs stable
<input checked="" type="checkbox"/>	Closing



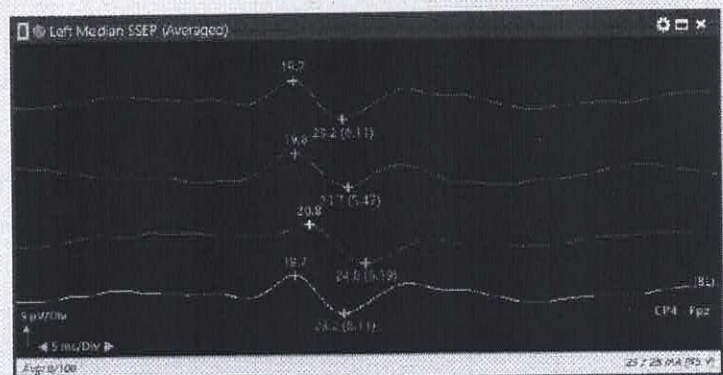
Choose screenshots to include in reports.

Strengthen documentation

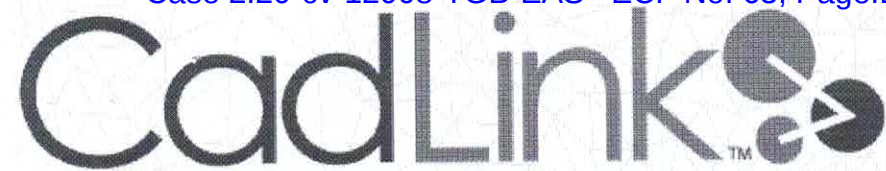
- Standardize demographic data collection.
- Enter comments just by typing.
- Choose whether to save the Chat Log.

Capture critical information

- Automatically capture screenshots with every User Event entry.
- Save the previous 30 seconds of EMG with Store Buffer.



Set up color-changing amplitude and latency cursor alerts.



Provide secure and efficient access to clinical information when and where you need it. CadLink helps deliver efficient workflow, quality data and easy reporting by connecting Cascade® Surgical Studio IONM, Arc® EEG, and Sierra® EMG/EP.

Ensure Fail-Safe Data Streaming

Safeguard against network connection failures by temporarily saving data locally and auto-streaming trace and video data to centralized storage on the CadLink Server.

Centrally Manage Setup and Updates

Manage CadLink Clients and settings from the CadLink Server. Update Clients independently of Cadwell applications.

Customize User Settings

All users can access their view and color preferences, even during live review.

Secure All Data and Communication

Encrypt the transfer and storage of patient data. Point-to-point communication ensures safe and efficient data transfer to the CadLink Server.

Enable Remote Live Review

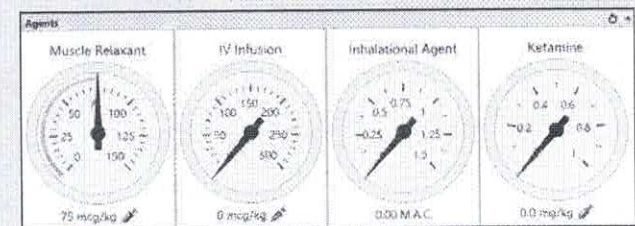
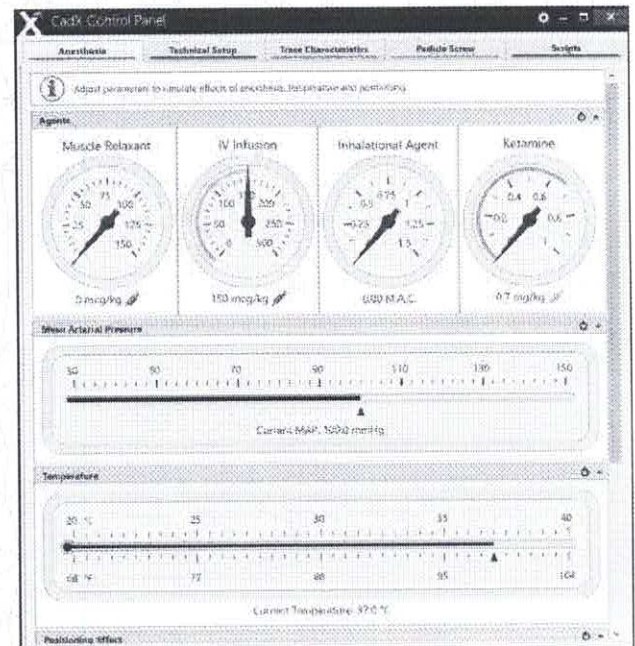
Review multiple studies simultaneously from any CadLink client via a local network, Internet, VPN or Citrix. Remote reviewers can customize their own view settings.

VISIT WWW.ESTORE.CADWELL.COM
FOR ALL OF YOUR IONM ELECTRODES, ACCESSORIES AND CONSUMABLE SUPPLIES

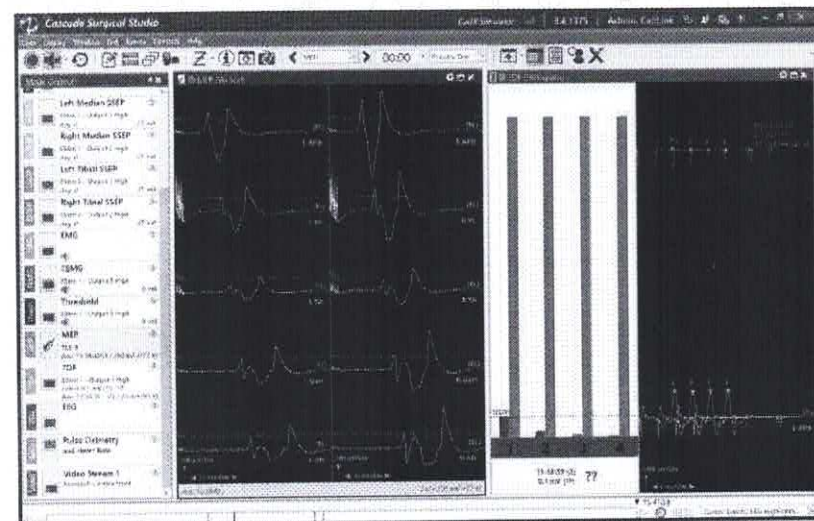




Simulate realistic data demonstrating anesthesia, technical and surgical effects with CadX simulation software. Train or teach using the same procedure setups and software tools used daily in the operating room.



Manipulate the CadX patient control panel to create real-world scenarios for demonstration and assessment purposes.



We are dedicated to developing industry-leading IONM solutions to help you help your patients.

THE CADWELL STORY

John Cadwell, BSEE, MD, saw a need for innovative and reliable neurophysiology instruments during his residency at the University of Washington School of Medicine.

John combined his experience in electrical engineering and medicine to design the world's first microprocessor-controlled EMG instrument. Together with his brother, Carl Cadwell, DDS, John formed Cadwell Laboratories in 1979.

In the 1980s, Cadwell developed the best-selling 5200A EMG and the Spectrum 32 EEG.

In the 1990s, Cadwell's Sierra took over the EMG line and Cadwell introduced Cascade IONM and Easy EEG.

In the 2000s, Cadwell developed the industry's best integrated report generator and introduced Easy PSG.

Lately, we have expanded our headquarters and opened offices in China and Singapore. Our global sales and support teams help physicians and medical centers worldwide help their patients.

Today, our brands include Arc EEG, LTM and ICU cEEG; Cascade® IONM; Sierra® EMG and EP with integrated ultrasound; Easy® PSG, and CadLink™ data management.

Cadwell is staying true to its mission: helping you help others.

Cadwell has a strong history of supporting customers. Please discuss service, support, warranty, and training information with your sales manager or distributor.



Cadwell Industries, Inc.
909 N. Kellogg St. • Kennewick, WA 99336
(800) 245-3001 • +1 (509) 735-6481 ph • +1 (509) 783-6503 fx
www.cadwell.com • info@cadwell.com

VISIT WWW.ESTORE.CADWELL.COM
FOR ALL OF YOUR ELECTRODES, ACCESSORIES AND CONSUMABLE SUPPLIES

Intraoperative neuromonitoring has been around since the 1970s and is a real time feed-back information to the surgeon about the functional status of the neural pathways that are under surgical manipulation. It presumes that by preventive or corrective actions, irreversible injury can be avoided.

Examples of IONM

Scalp electroencephalography (EEG) is used to record the activity of the brain tissue during epilepsy surgery and helps ensure that every tissue involved in epilepsy is resected.

Scalp EEG monitoring is used in neurovascular surgery as a sensitive and real time measure of adequate or inadequate cerebral blood flow.

Monitoring the peripheral nerve pathways all the way through the spinal cord to the cortex using somatosensory evoked potentials (SSEP) helps the surgeon with anatomical localization, accurate and safe dissection.

Electromyography records various muscle potentials and uses them to assess irritability and therefore injury in and around the peripheral nerves. The EMG allows surgical correlation with specific nerve roots.

Benefits.Cost-effectiveness of IONM - Evidence

In the Journal of Neurosurgery Spine 2011, Vincent Traynelis et al questioned the use of IONM in their article which noted that cervical decompression and reconstruction in their cohort without IONM saved \$1,024,754.00 in 720 patients, assuming 4 hours of surgery. We were not made aware of their post-surgical course and rehabilitation. We were not informed how much it cost to rehabilitate those that got worse, especially the 3 patients that developed new deficits after surgery.

Conversely since its introduction in the 1970s, the cost savings of IONM have been addressed variably and published

Sala et al in 2007 after a prospective review of patients who underwent surgery were in favor of IONM for scoliosis surgery based on their outcome data

Ney et al in 2018 reported greater cost with IONM but in the year after surgery, there was a net decrease in the cost of patient care. Studies in 2012 and 2015 had shown up to a 46% relative reduction in risk of neurological injuries despite increased surgical costs for spinal decompressions and fusions.

Ayoub et al in 2010 were in favor of IONM for cervical spine surgery. They reported a cost of \$31,546 per year for SSEP monitoring vs \$64 074 to \$102 192 per patient injured. In assessing these costs, the long term and life-time cost of a possible paraplegia have of course been eliminated despite this being a possible complication of spinal surgery.

References

Clin Neurophysiol 2012 Sep;123(9):1705-7. Cost-effectiveness of intraoperative neurophysiological monitoring for spinal surgeries: beginning steps
John P Ney¹, David N van der Goes, Jonathan H Watanabe

The Use of Intraoperative Neurophysiological Monitoring in Spine Surgery.
Charalampidis A, Jiang F, Wilson JRF, Badhiwala JH, Brodke DS, Fehlings MG. Global Spine J. 2020 Jan;10(1 Suppl):104S-114S

Acta Neurochir Suppl. 2017;124:263-270.

Intraoperative Neurophysiological Monitoring in Spine Surgery: A Significant Tool for Neuronal Protection and Functional Restoration

Antonino Scibilia¹, Giovanni Raffa², Vincenzo Rizzo³, Angelo Quartarone⁴, Massimiliano Visocchi⁵, Antonino Germanò¹, Francesco Tomasello¹

Studies, too numerous to name, have been clear about the utility of IONM and its ability to reduce neurological injury in spinal surgery including paraplegia and quadriplegia due to cord injury.

An extensive multicenter study conducted in 1995 demonstrated that IOM using SEP reduced the risk of paraplegia by 60% in spinal surgeries (Nuwer et al., 1995). The Therapeutics and Technology Assessment Subcommittee of the AAN (American Academy of Neurology) and the American Clinical Neurophysiology Society, has established IONM as effective to predict an increased risk of the adverse outcomes of paraparesis, paraplegia, and quadriplegia in spinal surgery (4 Class I studies, and 7 Class II studies) (Nuwer et al., 2012).

Class I studies meet all the requirements of a randomized controlled clinical trial. Class II studies typically have one requirement missing.



Platinum Delta SkyMiles® Business Credit Card
 NORTHWEST NEUROLOGY
 TESSY C JENKINS MD
 Closing Date 08/28/19 Next Closing Date 09/27/19



p. 1/8

Account Ending 0-65001

New Balance **\$51,750.93**
Minimum Payment Due **\$1,756.00**
Payment Due Date **09/22/19†**

† **Late Payment Warning:** If we do not receive your Minimum Payment Due by the Payment Due Date of 09/22/19, you may have to pay a late fee of up to \$39.00 and your APRs may be increased to the Penalty APR of 29.99%.

Minimum Payment Warning: If you make only the minimum payment each period, you will pay more in interest and it will take you longer to pay off your balance. For example:

If you make no additional charges and each month you pay...	You will pay off the balance shown on this statement in about...	And you will pay an estimated total of...
Only the Minimum Payment Due	33 years	\$119,891
\$1,973	3 years	\$71,023 (Savings = \$48,868)

If you would like information about credit counseling services, call 1-888-733-4139.

➔ See page 2 for important information about your account.

➔ Your account is currently enrolled in one or more optional travel insurance product(s). For refund requests, please see **Page 7** for your Travel Insurance Premium Refund/Credit form.

ⓘ Please note, your credit limit is \$60,000.00.

Continued on page 3

Delta SkyMiles®
 Miles Earned this Period **66,732**
 For more details about Rewards, please visit americanexpress.com/rewardsinfo

Account Summary

Previous Balance \$19,816.98
 Payments/Credits -\$25,000.00
 New Charges +\$56,755.94
 Fees +\$0.00
 Interest Charged +\$178.01

New Balance **\$51,750.93**
Minimum Payment Due **\$1,756.00**

Credit Limit \$60,000.00
 Available Credit \$8,249.07
 Cash Advance Limit \$5,000.00
 Available Cash \$5,000.00
 Days in Billing Period: 31

Customer Care

Pay by Computer
americanexpress.com/business

Customer Care 1-800-297-6200
Pay by Phone 1-800-472-9297

➔ See page 2 for additional information.

↓ Please fold on the perforation below, detach and return with your payment ↓

Payment Coupon
 Do not staple or use paper clips

Pay by Computer
americanexpress.com/business

Pay by Phone
 1-800-472-9297

Account Ending 0-65001

Enter 15 digit account # on all payments.
 Make check payable to American Express.

TESSY C JENKINS MD
 NORTHWEST NEUROLOGY
 27200 LAHSER RD
 STE 100
 SOUTHFIELD MI 48034-2137

Payment Due Date
09/22/19

New Balance
\$51,750.93

Minimum Payment Due
\$1,756.00

☐ Check here if your address or phone number has changed. Note changes on reverse side.

AMERICAN EXPRESS
 PO BOX 0001
 LOS ANGELES CA 90096-8000

\$ _____
Amount Enclosed



0000349991970398954 005175093000175600 24 H

Payments: Your payment must be sent to the payment address shown on your statement and must be received by 5 p.m. local time at that address to be credited as of the day it is received. Payments we receive after 5 p.m. will not be credited to your Account until the next day. Payments must also: (1) include the remittance coupon from your statement; (2) be made with a single check drawn on a US bank and payable in US dollars, or with a negotiable instrument payable in US dollars and clearable through the US banking system; and (3) include your Account number. If your payment does not meet all of the above requirements, crediting may be delayed and you may incur late payment fees and additional interest charges. Electronic payments must be made through an electronic payment method payable in US dollars and clearable through the US banking system. If we accept payment in a foreign currency, we will convert it into US dollars at a conversion rate that is acceptable to us, unless a particular rate is required by law. Please do not send post-dated checks as they will be deposited upon receipt. Any restrictive language on a payment we accept will have no effect on us without our express prior written approval. We will re-present to your financial institution any payment that is returned unpaid.

Permission for Electronic Withdrawal: (1) When you send a check for payment, you give us permission to electronically withdraw your payment from your deposit or other asset account. We will process checks electronically by transmitting the amount of the check, routing number, account number and check serial number to your financial institution, unless the check is not processable electronically or a less costly process is available. When we process your check electronically, your payment may be withdrawn from your deposit or other asset account as soon as the same day we receive your check, and you will not receive that cancelled check with your financial account statement. If we cannot collect the funds electronically we may issue a draft against your deposit or other asset account for the amount of the check. (2) By using Pay By Computer, Pay By Phone or any other electronic payment service of ours, you give us permission to electronically withdraw funds from the deposit or other asset account you specify in the amount you request. Payments using such services of ours received after 8:00 p.m. MST may not be credited until the next day.

How We Calculate Your Balance: We use the Average Daily Balance (ADB) method (including new transactions) to calculate the balance on which we charge interest on your Account. Call the Customer Care number listed below for more information about this balance computation method and how resulting interest charges are determined. *The method we use to calculate the ADB and interest results in daily compounding of interest.*

Paying Interest: Your due date is at least 25 days after the Closing Date of each billing period. We will not charge you interest on your purchases if you pay the New Balance by the due date each month. We will charge you interest on cash advances and (unless otherwise disclosed) balance transfers beginning on the transaction date.

Foreign Currency Charges: If you make a Charge in a foreign currency, we will convert it into US dollars on the date we or our agents process it. We will choose a conversion rate that is acceptable to us for that date, unless a particular rate is required by law. The conversion rate we use is no more than the highest official rate published by a government agency or the highest interbank rate we identify from customary banking sources on the conversion date or the prior business day. This rate may differ from rates in effect on the date of your charge. Charges converted by establishments (such as airlines) will be billed at the rates such establishments use.

Credit Balance: A credit balance (designated CR) shown on this statement represents money owed to you. If within the six-month period following the date of the first statement indicating the credit balance you do not request a refund or charge enough to use up the credit balance, we will send you a check for the credit balance within 30 days if the amount is \$1.00 or more.

Credit Reporting: We may report information about your Account to credit bureaus. Late payments, missed payments, or other defaults on your Account may be reflected in your credit report.



Customer Care & Billing Inquiries
International Collect
Large Print & Braille Statements
Cash Advance at ATMs Inquiries

1-800-297-6200

1-623-492-7719

1-800-297-6200

1-800-CASH-NOW

Hearing Impaired

TTY: 1-800-221-9950

FAX: 1-623-707-4442

In NY: 1-800-522-1897



Website: americanexpress.com

**Customer Care
& Billing Inquiries**
P.O. BOX 981535
EL PASO, TX
79998-1535

Payments
PO BOX 0001
LOS ANGELES CA
90096-8000

Change of Address

If correct on front, do not use.

- To change your address online, visit www.americanexpress.com/updatecontactinfo
- For Name, Company Name, and Foreign Address or Phone changes, please call Customer Care.
- Please print clearly in blue or black ink only in the boxes provided.

Street Address

City, State

Zip Code

Area Code and
Home Phone

Area Code and
Work Phone

Email

Pay Your Bill with AutoPay

- Avoid late fees
- Save time

Deduct your payment from your bank account automatically each month

Visit americanexpress.com/autopay today to enroll.

For information on how we protect your privacy and to set your communication and privacy choices, please visit www.americanexpress.com/privacy.



Case 2:20-cv-12008-TGB-EAS ECF No. 63 PageID.1473 Filed 02/23/21 Page 87 of 97
 Platinum Delta SkyMiles® Business Credit Card
 NORTHWEST NEUROLOGY
 TESSY C JENKINS MD
 Closing Date 08/28/19



p. 3/8

Account Ending 0-65001

Take Bill Paying off Your To-Do List

Grant a member of your team access to your account to log in and securely handle expense management on your behalf. Terms apply.

Visit www.AmericanExpress.com/enrollAM to enroll an Account Manager now.

Payments and Credits

Summary

	Total
Payments	-\$25,000.00
Credits	\$0.00
Total Payments and Credits	-\$25,000.00

Detail

*Indicates posting date

Payments	Amount
08/10/19* PAYMENT RECEIVED - THANK YOU	-\$20,000.00
08/22/19* ELECTRONIC PAYMENT RECEIVED-THANK	-\$5,000.00

New Charges

Summary

	Total
Total New Charges	\$56,755.94

Detail

*Indicates posting date

			Foreign Spend	Amount
07/29/19	ZIPRECRUITER 5469783 90401	SANTA MONICA	CA	\$249.00
07/29/19	AMAZON.COM*MA7RV3V82 MERCHANDISE	AMZN.COM/BILL	WA	\$17.38
07/29/19	AMAZON.COM*MA0XQ1XN2 MERCHANDISE	AMZN.COM/BILL	WA	\$28.99
07/30/19	HENRY SCHEIN* 800-472-4346	800-472-4346	NY	\$308.09
07/31/19	KELCOM KELCOM 519-977-5757	WINDSOR	125.95 Canadian Dollars	\$95.71
07/31/19	INTERMEDIA.NET INC 5415882 48034- CONTINUITY/SUBSCRIPT	BELLEVUE	WA	\$181.57
08/01/19	ISTORAGEL620FRGTONHILL 0375 248-292-3199	FARMINGTON	MI	\$121.00
08/02/19	NATUS MEDICAL, INC. 6088298500	PLEASANTON	CA	\$105.26
08/02/19	VISTAPR*VISTAPRINT.COM PRINTING	866-8936743	MA	\$18.00

Continued on reverse

Detail Continued

*Indicates posting date

			Foreign Spend	Amount
08/05/19	CollaborateMD 039300981097495 COMPUTER PROGRAMMING	ORLANDO	FL	\$319.00
08/05/19	AMAZON.COM*MA6HQ52S2 MERCHANDISE	AMZN.COM/BILL	WA	\$52.96
08/06/19	BEDBATH&BEYOND#0295 295 MISC HOME FURNISHINGS	BEVERLY HILL	MI	\$137.79
08/06/19	SAMSLUB.COM#6279 6279 888-746-7726	TEMPLE	TX	\$127.12
08/08/19	SCREEN 206-786-9731	SEATTLE	WA	\$1,435.00
08/09/19	KELCOM KELCOM 519-977-5757	WINDSOR	135.90 Canadian Dollars	\$102.47
08/09/19	CADWELL LAB ONLINE 509-735-6481	(509)735-6481	WA	\$41,483.63
08/09/19	CINTAS 60A CINTAS.COM	MASON	OH	\$347.52
08/09/19	WESTIN SOUTHFIELD Arrival Date Departure Date 08/09/19 08/12/19 00000000 LODGING	SOUTHFIELD	MI	\$548.06
08/10/19	AMZN MKTP US*MA66E0BVO BOOK STORES	AMZN.COM/BILL	WA	\$33.38
08/13/19	MVAP MEDICAL SUPPLIES 877-735-6827	877-735-6827	CA	\$545.66
08/14/19	PRACTICE FUSION HEALTH RECOR	415-346-7700	CA	\$198.00
08/14/19	ENDICOTT CALL CENTERS 094040310010831 MGAITANIS@ANSAFONE.COM	OCALA	FL	\$775.00
08/15/19	USPS POSTAGE STAMPS.COM 900000001 8884340055	EL SEGUNDO	CA	\$100.00
08/15/19	CLUBCORP SERVICE CARDX CLUBCORP SERVIC 877-515-4248	DALLAS	TX	\$598.99
08/16/19	G2GCHARGE.COM 00-08008394275 248-8588812	PONTIAC	MI	\$177.86
08/16/19	SOUTHFIELD TOWNSHIP 00-08014565298 248-5403420	SOUTHFIELD TO	MI	\$6,467.57
08/17/19	ITUNES.COM/BILL RECORD STORE	INTERNET CHARGE	CA	\$9.99
08/19/19	AMZN MKTP US*MO2N48NR1 BOOK STORES	AMZN.COM/BILL	WA	\$132.98
08/19/19	AMZN MKTP US*MO95P0AJ2 BOOK STORES	AMZN.COM/BILL	WA	\$53.99
08/19/19	AMAZON.COM*MA5FP8I30 MERCHANDISE	AMZN.COM/BILL	WA	\$51.33
08/19/19	AMAZON.COM*MO99B5N51 MERCHANDISE	AMZN.COM/BILL	WA	\$119.09
08/19/19	AMAZON.COM*MO4VX8TY2 MERCHANDISE	AMZN.COM/BILL	WA	\$135.67
08/19/19	ENTERPRISE RENTACAR LIVONIA Location Date Rental: SOUTHFIELD MI 19/08/05 Return: SOUTHFIELD MI 19/08/19 Agreement Number: 6MX9FB Renter Name: TESSY JENKINS MD	SOUTHFIELD	MI	\$1,315.37
08/20/19	BT*QUICKEN INC 8883117276	MENLO PARK	CA	\$37.09

Continued on next page



Account Ending 0-65001

Detail Continued

*Indicates posting date

			Foreign Spend	Amount
08/20/19	STAMPS.COM 855-608-2677	(855)608-2677	CA	\$17.99
08/21/19*	TRANSACTION PROCESSED BY AMERICAN EXPRESS PREM CAR RENTAL PROTECTION 800-326-2078 CRA009987409 08/05/2019 SOUTHFIELD			\$24.95
08/21/19	ITUNES.COM/BILL RECORD STORE	INTERNET CHARGE	CA	\$0.99
08/23/19	CINTAS 60A CINTAS.COM	MASON	OH	\$233.52
08/24/19	AMAZON MUSIC*MO8CQ1XV2 DIGITAL	888-802-3080	WA	\$3.99
08/27/19	AMZN FREETIME*MO3LJ7BM2 DIGITAL	888-802-3080	WA	\$6.99
08/27/19	AMZN MKTP US*MO5US35L1 BOOK STORES	AMZN.COM/BILL	WA	\$36.99

Fees

	Amount
Total Fees for this Period	\$0.00

Interest Charged

	Amount
08/28/19 Interest Charge on Purchases	\$178.01
Total Interest Charged for this Period	\$178.01

About Trailing Interest

You may see interest on your next statement even if you pay the new balance in full and on time and make no new charges. This is called "trailing interest." Trailing interest is the interest charged when, for example, you didn't pay your previous balance in full. When that happens we charge interest from the first day of the billing period until we receive your payment in full. You can avoid paying interest on purchases by paying your balance in full and on time each month. Please see the "When we charge interest" sub-section in your Cardmember Agreement for details.

2019 Fees and Interest Totals Year-to-Date

	Amount
Total Fees in 2019	\$0.00
Total Interest in 2019	\$1,703.26

Interest Charge Calculation

Your Annual Percentage Rate (APR) is the annual interest rate on your account.

	Annual Percentage Rate	Balance Subject to Interest Rate	Interest Charge
Purchases	21.74% (v)	\$9,634.68	\$178.01

Continued on reverse

Interest Charge Calculation Continued

Your Annual Percentage Rate (APR) is the annual interest rate on your account.

	Annual Percentage Rate	Balance Subject to Interest Rate	Interest Charge
Cash Advances	27.24% (v)	\$0.00	\$0.00
Total			\$178.01
(v) Variable Rate			

Miles Earned

SkyMiles® Account Number: XXXXXX8307



	Current Period	Year to Date
Miles Earned for Eligible Purchases	56,732	103,375
Total Bonus Miles Earned and Adjustments	10,000	20,011
Total Miles Earned	66,732	123,386

Bonus Miles Earned and Adjustments

	Current Period
Miles Boost™ (MQMs)	10,000
Total	10,000

Congratulations! You have earned another Miles Boost™ of 10,000 Medallion® Qualification Miles (MQMs) by reaching \$50,000 in eligible purchases. Terms and Conditions apply. Please visit americanexpress.com/deltaplatinum for details.



Travel Insurance Premium Refund/Credit Form

In this billing statement, you have been billed one or more premiums for optional insurance products in which you are currently enrolled. There may be occasions when you are billed premiums based on charges that are not covered by your insurance products.

If you have been charged an insurance premium for one of the reasons listed below, you should request a refund. To do so, you can call us, complete the online refund request form, or complete the form below and include it with payment of your bill. You can subtract the total premium refund amount from your new balance. If you do not fill out this form completely, your request may be delayed or denied. If we deny your request, you will be responsible for paying your total balance in full.

Please see the back of this form if requesting refunds for TravelAssure or TravelAssure Classic and for additional information on requesting a refund.

Reasons for Refund/Credit:

- A. Non-fare airline services charges (e.g. excess baggage, itinerary charges, upgrade, or any other non-air transportation charges)
- B. Unused airline tickets or cancelled trips (only select this option if the airline will not be providing a refund to your American Express account for the cancelled trip)
- C. Non-scheduled airline flights (e.g. private jet)
- D. Two or more insurance premiums charged for same car rental
- E. Car rental no-show
- F. Other charges unrelated to actual car rental (e.g. gas)
- G. Car rental in an excluded country (i.e. Australia, Ireland, Israel, Italy, Jamaica, and New Zealand)
- H. A vehicle other than a rental car
- I. Insurance coverage required by a car rental company

If you believe you are eligible for a refund for any other reason, or if you have questions, please call the number on the back of your Card to speak with a Customer Care Professional.

Please detach here

Airline or Car Rental Company Name	Ticket/Rental Amount	Airline Ticket or Car Rental Agreement Number	Month Billed	Reason for Refund	Insurance Product	Amount of Insurance Premium Refund Requested
"Sample Airlines"	\$374.20	0012351230912	March	B	Travel Delay	\$9.95

Additional space is available on the reverse side of this form.

Additional information to assist you in completing the refund form	
Ways to request a refund	If you have questions or do not wish to request your refund by submitting this form, you may call the number on the back of your Card or fill out the refund coupon available with your online billing statement. For additional information on requesting your refund online, please visit americanexpress.com/insurancerefund .
Requesting a refund	<p>Please do not fill this form out if you expect a credit to your Card account for your airline ticket charge. You will automatically receive a refund once your ticket is credited on your American Express account. Refunds will appear as credits on your monthly statement.</p> <p>If you do not expect a credit for your airline ticket charge, fill out this refund form completely and return the form with your payment. Please deduct the total premium refund amount from your new balance.</p>
TravelAssure and TravelAssure Classic	<p>If you are requesting a refund for TravelAssure or TravelAssure Classic, follow the previous instructions and use the information below to determine the amount of the refund you should request:</p> <p>If you cancelled an airline ticket but will not receive a credit to your Card account for your airline ticket charge you're entitled to a partial* premium refund as follows:</p> <ul style="list-style-type: none"> For TravelAssure, which has an insurance premium of \$28.95, you are eligible for a partial refund in the amount of \$10. Please deduct this amount from your new balance for each insurance premium charge eligible for refund. For TravelAssure Classic, which has an insurance premium of \$19.95, you are eligible for a partial refund in the amount of \$8. Please deduct this amount from your new balance for each insurance premium charge eligible for refund. <p>If you are requesting a refund for a different eligible reason, you should request a refund for the full insurance premium amount that was billed.</p> <p>* TravelAssure and TravelAssure Classic can provide coverage for Trip Cancellation as well as other types of coverage. When requesting a refund due to a cancelled trip, please note that a refund will not be granted for the portion of the premium associated with Trip Cancellation, since that coverage already will have already gone into effect. You'll receive a partial refund of \$10 per TravelAssure and \$8 per TravelAssure Classic charge for the portion of the premium not related Trip Cancellation coverage. You can still submit claims to recover nonrefundable trip costs.</p>

Airline or Car Rental Company Name	Ticket/ Rental Amount	Airline Ticket or Car Rental Agreement Number	Month Billed	Reason for Refund	Insurance Product	Amount of Insurance Premium Refund Requested



Evidence-based guideline update: Intraoperative spinal monitoring with somatosensory and transcranial electrical motor evoked potentials

Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and the American Clinical Neurophysiology Society

M.R. Nuwer, MD, PhD,
FAAN
R.G. Emerson, MD,
FAAN
G. Galloway, MD,
FAAN
A.D. Legatt, MD, PhD,
FAAN
J. Lopez, MD
R. Minahan, MD
T. Yamada, MD
D.S. Goodin, MD
C. Armon, MD, MHS,
FAAN
V. Chaudhry, MD,
FAAN
G.S. Gronseth, MD,
FAAN
C.L. Harden, MD

Correspondence & reprint requests to American Academy of Neurology: guidelines@aan.com

ABSTRACT

Objective: To evaluate whether spinal cord intraoperative monitoring (IOM) with somatosensory and transcranial electrical motor evoked potentials (EPs) predicts adverse surgical outcomes.

Methods: A panel of experts reviewed the results of a comprehensive literature search and identified published studies relevant to the clinical question. These studies were classified according to the evidence-based methodology of the American Academy of Neurology. Objective outcomes of postoperative onset of paraparesis, paraplegia, and quadriplegia were used because no randomized or masked studies were available.

Results and Recommendations: Four Class I and 8 Class II studies met inclusion criteria for analysis. The 4 Class I studies and 7 of the 8 Class II studies reached significance in showing that paraparesis, paraplegia, and quadriplegia occurred in the IOM patients with EP changes compared with the IOM group without EP changes. All studies were consistent in showing all occurrences of paraparesis, paraplegia, and quadriplegia in the IOM patients with EP changes, with no occurrences of paraparesis, paraplegia, and quadriplegia in patients without EP changes. In the Class I studies, 16%–40% of the IOM patients with EP changes developed postoperative-onset paraparesis, paraplegia, or quadriplegia. IOM is established as effective to predict an increased risk of the adverse outcomes of paraparesis, paraplegia, and quadriplegia in spinal surgery (4 Class I and 7 Class II studies). Surgeons and other members of the operating team should be alerted to the increased risk of severe adverse neurologic outcomes in patients with important IOM changes (Level A). *Neurology*® 2012;78:585–589

GLOSSARY

AAN = American Academy of Neurology; **ACNS** = American Clinical Neurophysiology Society; **EP** = evoked potential; **IOM** = intraoperative monitoring; **MEP** = motor evoked potential; **SEP** = somatosensory evoked potential; **tce** = transcranial electrical.

Paraparesis, paraplegia, and quadriplegia are complications of spinal surgery and certain surgeries of the aorta. Intraoperative monitoring (IOM) of neural function is used to warn of the risk of surgical complications.^{1–6} Anesthesiologists and surgeons are able to intervene in a variety of ways when IOM raises warnings. They can modify surgery by interventions such as reducing the degree of distraction, adjust-

ing retractors, removing or adjusting grafts or hardware, reimplanting or unclamping arteries, placing vascular bypass grafts, minimizing the remaining portion of the surgery, or other actions. Surgeons also have the opportunity to check a wake-up test in some patients.

This evidence-based guideline seeks to answer the clinical question: Does IOM with somatosensory

Supplemental data at www.neurology.org

Supplemental Data



From the Department of Neurology (M.R.N.), University of California Los Angeles School of Medicine, Los Angeles; Hospital for Special Surgery (R.G.E.), New York, NY; Departments of Neurology and Pediatrics (G.G.), Nationwide Children's Hospital, Ohio State University, Columbus; Department of Neurology (A.D.L.), Albert Einstein School of Medicine, Bronx, NY; Department of Neurology (J.L.), Stanford University School of Medicine, Stanford, CA; Department of Neurology (R.M.), Georgetown University School of Medicine, Washington, DC; Department of Neurology (T.Y.), University of Iowa School of Medicine, Iowa City; Department of Neurology (D.S.G.), University of California at San Francisco, San Francisco; Division of Neurology (C.A.), Tufts University School of Medicine and Baystate Medical Center, Springfield, MA; Department of Neurology (V.C.), Johns Hopkins School of Medicine, Baltimore, MD; Department of Neurology (G.S.G.), University of Kansas School of Medicine, Kansas City; and Department of Neurology (C.L.H.), Hofstra North Shore-Long Island Jewish School of Medicine, New Hyde Park, NY.

Study funding: This evidence-based guideline was funded by the American Academy of Neurology and the American Clinical Neurophysiology Society. No author received honoraria or financial support to develop this document.

Approved by the AAN Therapeutics and Technology Assessment Subcommittee on February 19, 2011; by the AAN Practice Committee on May 19, 2011; by the AAN Board of Directors on October 14, 2011; and by the ACNS Council on June 11, 2011.

Disclosure: Author disclosures are provided at the end of the article.

evoked potentials (SEPs) and transcranial electrical (tce) motor evoked potentials (MEPs) predict adverse surgical outcomes?

The panel addressed this question on the basis of subgroup analyses of well-defined patient cohorts, comparing the clinical outcomes of those patients who had evoked potential (EP) changes with those who had no EP changes. The panel recognized an inherent limitation in assessing the specificity of IOM changes when those changes resulted in clinical interventions by anesthesiologists or surgeons.

The panel applied the following reasoning:

1. If it can be shown that adverse IOM changes predict increased risk of adverse clinical outcomes consistently, then all adverse IOM changes may represent possible compromise of the spinal cord that might result in an adverse outcome.
2. Nonobjective outcomes are particularly problematic for assessing the usefulness of IOM because of the potential for diagnostic suspicion bias. Patients with abnormal IOM might be more thoroughly evaluated postoperatively than patients without intraoperative changes. Without masked outcome assessment and a standardized method of case ascertainment, only obvious outcomes (e.g., new paraplegia) are likely to be noticed in patients with normal IOM. Subtler changes, such as sensory changes, could easily be missed. This bias would tend to exaggerate the usefulness of IOM. Therefore, the only outcomes assessed were new paraparesis, paraplegia, and quadriplegia, because these neurologic deficits are more objective signs than are less-severe deficits.

DESCRIPTION OF THE ANALYTIC PROCESS

Seven physician clinical neurophysiologists were appointed to write this guideline (M.R.N., R.G.E., G.G., A.D.L., J.L., R.M., and T.Y.) because of their expertise in spinal IOM. The panel members were appointed jointly by the Therapeutics and Technology Assessment Subcommittee (see appendices e-1 and e-2 on the *Neurology*[®] Web site at www.neurology.org) of the American Academy of Neurology (AAN) and the American Clinical Neurophysiology Society (ACNS). Five additional panel members (D.S.G., C.A., V.C., G.S.G., and C.L.H.) served as methodology experts.

A research librarian performed literature searches of the MEDLINE and EMBASE databases using the following keywords: monitoring, intraoperative, evoked potentials, paralysis, and intraoperative complications. Additional articles were found from among the references cited in the reports reviewed. Each article was reviewed independently by at least 2 panel members. Appendix e-3 presents the complete

MEDLINE search strategy, and appendix e-4 presents the complete EMBASE search strategy.

The panel elected to focus on the 2 most common current spinal cord IOM techniques. The SEP technique evaluated was ankle-wrist stimulation with neck-scalp recording. The MEP technique evaluated was tceMEP with muscle recording.

Minimum size for study inclusion was 100 patients for orthopedic procedures and 20 patients for neurosurgical or cardiothoracic procedures. Different numbers were used because the rates of adverse neurologic outcomes are lower for orthopedic spine procedures compared with those for neurosurgical and cardiothoracic procedures.

A study was included if it represented a consecutive series of a representative group of patients, preferably prospective; if the IOM followed a protocol established in advance; if the IOM changes were identified in real time, before outcomes were known; and if the clinical outcomes of interest (paraparesis, paraplegia, and quadriplegia) were clearly reported. Reports were reviewed and scored independently by all content expert panelists. Those panelists discussed and resolved by consensus the methodology, results, relevance, and conclusions for a few reports for which there was initial panel discrepancy.

Next, these articles were rated using the AAN 4-tiered (Class I–Class IV) classification of evidence scheme for rating diagnostic studies (appendix e-5), and conclusions and recommendations were linked to the strength of the evidence (appendix e-6). All articles that were rated Class I or Class II are listed in table e-1. The primary data evaluated were the results from a comparison of the group without EP changes with the group with EP changes in both the number of cases with new postoperative paraparesis, paraplegia, and quadriplegia and the number without these conditions. Descriptive statistics and the Fisher exact test were used for statistical analysis.

ANALYSIS OF EVIDENCE The search identified an initial set of 604 reports. Of those, 40 articles met the inclusion criteria, but 28 were subsequently excluded because they contained Class III or IV data; did not address the outcomes of paraparesis, paraplegia, or quadriplegia; primarily assessed nerve roots instead of the spinal cord; or substantially relied on techniques beyond the scope of this guideline.

Twelve studies^{7–18} provide evidence to assess the role of IOM in the prediction of adverse outcomes (table e-1), 4 of which were Class I.^{7–10} One Class I study⁷ found that no events of paraparesis, paraplegia, or quadriplegia occurred in 17 IOM patients without EP changes, but 5 of these adverse events occurred in 16 IOM patients with EP changes (31%) (Fisher exact test

$p = 0.0184$). In the second Class I study,⁸ no events of paraparesis, paraplegia, or quadriplegia occurred in 84 IOM patients without EP changes, but among 25 IOM patients with EP changes, 4 (16%) had adverse outcomes: 1 had paraplegia, 1 had quadriplegia, and 2 had worsening of preexisting paraparesis (Fisher exact test $p = 0.00369$). In the third Class I study,⁹ no events of paraparesis, paraplegia, or quadriplegia occurred in 45 IOM patients without EP changes, but 2 adverse events occurred in 5 IOM patients with EP changes (40%) (Fisher exact test $p = 0.0158$). In the fourth Class I study,¹⁰ no events of paraparesis, paraplegia, or quadriplegia occurred in 49 IOM patients without EP changes, but 8 adverse events occurred in 20 IOM patients with EP changes (40%) (Fisher exact test $p = 0.000148$). Overall, events of paraparesis, paraplegia, or quadriplegia occurred in 16%–40% of IOM patients with EP changes, but no adverse outcome events occurred in patients without an EP change.

The other 8 articles were Class II.^{11–18} No events of paraparesis, paraplegia, or quadriplegia occurred in 108 of 1,378 IOM patients without EP changes, whereas these severe adverse outcome events occurred in 1%–100% of the 1–72 IOM patients with EP changes. Seven of these studies reached significance by Fisher exact test ($p < 0.05$).^{11–16,18}

All studies were consistent in that all paraparesis, paraplegia, and quadriplegia events occurred in the IOM patients with EP changes, and none occurred in the IOM patients without EP changes.

This assessment did not undertake to evaluate lesser degrees of motor impairment, which would underestimate the overall adverse outcome rate. It did not assess radiculopathy or similar complications of lumbar fusion.

The one prospective comparative study³ of motor outcomes in patients with IOM vs those without IOM was excluded from this assessment because it used graded motor power changes rather than the presence of paraparesis, paraplegia, and quadriplegia as its outcome measure. That cohort study measured motor outcome and the decision to monitor, not whether the monitoring showed intraoperative changes. The study showed a significant positive relationship between decision to monitor and better motor outcome.

CONCLUSION IOM is established as effective to predict an increased risk of the adverse outcomes of paraparesis, paraplegia, and quadriplegia in spinal surgery (4 Class I and 7 Class II studies).

RECOMMENDATION Surgeons and other members of the operating team should be alerted to the increased risk of severe adverse neurologic outcomes in patients with important IOM changes (Level A).

CLINICAL CONTEXT In practice, after being alerted to IOM changes, the operating team intervenes to attempt to reduce the risk of adverse neurologic outcomes. No studies in humans have directly measured the efficacy of such interventions. However, multiple controlled studies in animals^{19–24} have demonstrated that intervening after IOM alerts (as opposed to not intervening) reduces the risk of permanent neurologic injury. On this basis, it seems reasonable to assume that such interventions might improve outcomes in humans as well. It is unlikely that controlled human studies designed to determine the efficacy of post-IOM alert interventions will ever be performed.

This analysis did not compare MEP with SEP. The 2 techniques differ slightly. MEP more directly monitors the motor pathway itself. One technique may change while the other remains stable, or one may change earlier than the other. MEP requires more restrictive anesthesia requirements, causes patient movement, and has less-clear criteria for raising an alarm. SEP can localize an injury or site of ischemia more exactly. The tceMEPs are often used intermittently because of movements that occur with the stimulus. Sometimes one technique can be accomplished throughout a case, whereas the other techniques cannot. As a result, it may be most appropriate for the surgeon, anesthesiologist, and neurophysiologic monitoring team to choose which techniques are most appropriate for an individual patient. Conducting both techniques together is a reasonable choice for many patients. Neither technique can predict the onset of paraplegia that is delayed until hours or days after the end of surgery. Neither technique should be considered to have perfect predictive ability when no EP change is seen; rare false-negative monitoring has occurred.^{1,2}

The studies reported here varied somewhat in the criteria used to raise alerts. The specific criteria used are reported in table e-1.

These IOM studies involved a knowledgeable professional clinical neurophysiologist supervisor. These studies support performance of IOM when conducted under the supervision of a clinical neurophysiologist experienced with IOM.^{2,25,26} IOM conducted by technicians alone or by an automated device is not supported by the studies reported here because these studies did not use that practice model and because there is a lack of identified well-designed published outcomes studies demonstrating efficacy with those practice models.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. Pooling of results from a large series of well-monitored patients may permit determination if the low false-negative frequency for MEP IOM in the reported studies is a generalizable observation.
2. A better understanding of anterior spinal artery

syndrome may help to reduce further the rate of paraplegia and paraparesis after spinal surgery.

3. If limitations in the techniques reviewed can be identified explicitly and methods to correct those limitations are developed, then comparisons among different monitoring techniques may be desirable.

AUTHOR CONTRIBUTIONS

Dr. Nuwer: drafting/revising the manuscript, study concept or design, analysis or interpretation of data, statistical analysis. Dr. Emerson: drafting/revising the manuscript, analysis or interpretation of data, statistical analysis. Dr. Galloway: drafting/revising the manuscript, study concept or design, analysis or interpretation of data. Dr. Legatt: drafting/revising the manuscript, analysis or interpretation of data. Dr. Lopez: drafting/revising the manuscript, study concept or design, analysis or interpretation of data, acquisition of data. Dr. Minahan: drafting/revising the manuscript, study concept or design, analysis or interpretation of data. Dr. Yamada: drafting/revising the manuscript, contribution of vital reagents/tools/patients, acquisition of data, statistical analysis. Dr. Goodin: drafting/revising the manuscript. Dr. Armon: drafting/revising the manuscript, study concept or design, analysis or interpretation of data. Dr. Chaudhry: drafting/revising the manuscript, analysis or interpretation of data. Dr. Gronseth: drafting/revising the manuscript, analysis or interpretation of data, statistical analysis. Dr. Harden: drafting/revising the manuscript, statistical analysis.

DISCLOSURE

Dr. Nuwer estimates that 20% of his clinical effort is spent on intraoperative spinal cord monitoring; serves on a scientific advisory board for Corticare; serves on editorial advisory boards for *Clinical Neurophysiology*, *Journal of Clinical Neurophysiology*, *Practical Neurology*, and *Medical Economics*; receives publishing royalties for *Intraoperative Neurophysiologic Monitoring* (Cambridge University Press, 2010); serves as a consultant for Mattel; serves as Local Medical Director for SleepMed-Digitrace; receives research support from Bristol-Myers Squibb; holds stock in Corticare; and has provided depositions and expert testimony in medico-legal cases. Dr. Emerson has filed patents re: Dynamic adjustable spatial granularity for EEG display and systems and methods for measuring brain activity; serves as a consultant for Persyst Development Corporation; estimates that 85% of his clinical effort is spent on intraoperative monitoring; and receives research support from Cyberkinetics Neurotechnology Systems Inc., the NIH, NYS SCIRB, and the Epilepsy Foundation. Dr. Galloway estimates that 60% of her clinical effort is spent on intraoperative monitoring. Dr. Legatt serves on the editorial board of the *Journal of Clinical Neurophysiology*; holds equity in Entremed, Pfizer Inc, Teva Pharmaceutical Industries Ltd., GlaxoSmithKline, Johnson & Johnson, Schering-Plough Corp., GE Healthcare, and Proctor & Gamble; estimates that 65% of his clinical effort is spent on intraoperative monitoring; and has provided expert testimony in medico-legal cases. Dr. Lopez has received funding for travel from Cadwell Laboratories, Inc.; receives publishing royalties for *Intraoperative Neurophysiologic Monitoring* (Cambridge University Press, 2010); estimates that 60% of his clinical effort is spent on intraoperative monitoring; and has provided expert testimony in medico-legal cases. Dr. Minahan estimates that 60% of his clinical effort is spent on intraoperative monitoring and has provided expert testimony in medico-legal cases. Dr. Yamada estimates that 10% of his clinical effort is spent on intraoperative monitoring; serves on the editorial board of the *Journal of Clinical Neurophysiology*; and receives publishing royalties for *Practical Guide for Clinical Neurophysiologic Testing: EEG* (Wolters Kluwer/Lippincott Williams & Wilkins, 2010) and *Practical Guide for Clinical Neurophysiologic Testing: EP, LTM, JOM, PSFG and NCS* (Wolters Kluwer/Lippincott Williams & Wilkins, 2011). Dr. Goodin has served on scientific advisory boards for Bayer Schering Pharma and Merck Serono; has received funding for travel and honoraria for speaking and consulting from Bayer Schering Pharma, Teva Pharmaceutical Industries Ltd., Novartis, and Merck Serono; has received speaker honoraria from Bayer Schering Pharma; has received research support from Bayer Schering Pharma and Novartis; and has served as an expert witness in medico-legal cases; holds equity interest in Teva Pharmaceutical Industries Ltd. and Biogen Idec. Dr. Armon has served on a scientific advisory board for Avanir Pharmaceuticals; serves on the editorial

boards of *Neurology*® and *emedicine Neurology*; has received honoraria from Medscape Today; receives publishing royalties from emedicine.com for updating electronic chapters and from UpToDate; has received research support from Avanir Pharmaceuticals, Schwartz Biomedical, LLC, the NIH, and the Swiss PFO-Consortium; and has served as an expert witness in medico-legal cases. Dr. Chaudhry serves on the editorial board of *Neurologist*; is an inventor on patent(s) re: Total Neuropathy Score (TNS)—a score for evaluating peripheral neuropathies, for which he receives technology royalties from Abbott, Johnson & Johnson, and sanofi-aventis; receives publishing royalties for *Harrison's Principles of Internal Medicine*, 17th ed. (McGraw Hill Companies, Inc., 2008); estimates that 40% of his clinical effort is spent on nerve conduction studies; has given expert testimony for the Department of Health and Human Services Vaccine Injury Compensation program; and receives research support from the Neuropathy Association and Nutricia. Dr. Gronseth serves as an editorial advisory board member of *Neurology Now*; serves on a speakers' bureau for Boehringer Ingelheim; and receives honoraria from Boehringer Ingelheim and the American Academy of Neurology. Dr. Harden serves on a scientific advisory board for Upsher-Smith Laboratories, Inc.; serves on speakers' bureaus for and has received speaker honoraria from GlaxoSmithKline, UCB, and Lundbeck, Inc.; serves on the editorial boards of *Epilepsy Currents* and *Epilepsy Research*; receives publishing royalties from UpToDate, Inc.; and receives research support from Forest Laboratories, Inc., the Epilepsy Foundation, and the Milken Family Foundation.

DISCLAIMER

This statement is provided as an educational service of the American Academy of Neurology and American Clinical Neurophysiology Society. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods for care of a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodology. The AAN and ACNS recognize that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all circumstances involved. The clinical context section is made available to place the evidence-based guideline into perspective with current practice habits and challenges. No formal practice recommendation should be inferred.

CONFLICT OF INTEREST

The American Academy of Neurology and American Clinical Neurophysiology Society are committed to producing independent, critical, and truthful clinical practice guidelines (CPGs). Significant efforts are made to minimize the potential for conflicts of interest to influence the recommendations of this CPG. To the extent possible, the AAN and ACNS keep separate those who have a financial stake in the success or failure of the products appraised in the CPG and the developers of the guidelines. Conflicts of interest forms were obtained from all authors and reviewed by an oversight committee prior to project inception. AAN and ACNS limit the participation of authors with substantial conflicts of interest. They forbid commercial participation in, or funding of, guidelines projects. Drafts of the guideline have been reviewed by at least three committees of the AAN and ACNS, a network of neurologists, *Neurology* peer reviewers, and representatives from related fields. The AAN Guideline Author Conflict of Interest Policy can be viewed at www.aan.com.

Received June 17, 2011. Accepted in final form October 7, 2011.

REFERENCES

1. Nuwer MR, ed. *Intraoperative Monitoring of Neural Function*. Amsterdam: Elsevier; 2008. Daube JR, Marguier F, series eds. *Handbook of Clinical Neurophysiology*; vol 8.
2. Nuwer MR, Dawson EG, Carlson G, Kanim LEA, Sherman JE. Somatosensory evoked potential spinal cord monitoring reduces neurologic deficits after scoliosis surgery: results of a large multicenter survey. *Electroencephalogr Clin Neurophysiol* 1995;96:6–11.
3. Sala F, Palandri G, Basso E, et al. Motor evoked potential monitoring improves outcome after surgery for intramed-

- ullary spinal cord tumors: a historical control study. *Neurosurgery* 2006;58:1129–1143.
4. Harner SG, Daube JR, Ebersold MJ, Beatty CW. Improved preservation of facial nerve function with use of electrical monitoring during removal of acoustic neuromas. *Mayo Clin Proc* 1987;62:92–102.
5. Radtke RA, Erwin CW, Wilkins RH. Intraoperative brainstem auditory evoked potentials: significant decrease in postoperative morbidity. *Neurology* 1989;39:187–191.
6. Fehlings MG, Brodke DS, Norvell DC, Dettori JR. The evidence for intraoperative neurophysiological monitoring in spine surgery: does it make a difference? *Spine* 2010;35:S37–S46.
7. Cunningham JN Jr, Laschinger JC, Spencer FC. Monitoring of somatosensory evoked potentials during surgical procedures on the thoracoabdominal aorta: IV: clinical observations and results. *J Thorac Cardiovasc Surg* 94:275–285. 1987.
8. Sutter M, Eggspuehler A, Grob D, et al. The validity of multimodal intraoperative monitoring (MIOM) in surgery of 109 spine and spinal cord tumors. *Eur Spine J* 2007;16:S197–S208.
9. Costa P, Bruno A, Bonzanino M, et al. Somatosensory and motor-evoked potential monitoring during spine and spinal cord surgery. *Spinal Cord* 2007;45:86–91.
10. Weinzierl MR, Reinacher P, Gilsbach JM, Rohde V. Combined motor and somatosensory evoked potentials for intraoperative monitoring: intra- and postoperative data in a series of 69 operations. *Neurosurg Rev* 2007;30:109–116.
11. Etz CD, Halstead JC, Spielvogel D, et al. Thoracic and thoracoabdominal aneurysm repair: is reimplantation of spinal cord arteries a waste of time? *Ann Thorac Surg* 2006;82:1670–1678.
12. May DM, Jones SJ, Crockard HA. Somatosensory evoked potential monitoring in cervical surgery: Identification of pre- and post-operative risk factors associated with neurological deterioration. *J Neurosurg* 1996;85:566–573.
13. Lee JY, Hilibrand AS, Lim MR, et al. Characterization of neurophysiologic alerts during anterior cervical spine surgery. *Spine* 2006;31:1916–1922.
14. Pelosi L, Lamb J, Grevitt M, Mehdian SMH, Webb JK, Blumhardt LD. Combined monitoring of motor and somatosensory evoked potentials in orthopaedic spinal surgery. *Clin Neurophysiol* 2002;113:1082–1091.
15. Hilibrand AS, Schwartz DM, Sethuraman V, Vaccaro AR, Albert TJ. Comparison of transcranial electrical motor and somatosensory evoked potential monitoring during cervical spine surgery. *J Bone Joint Surg* 2004;86A:1248–1253.
16. Jacobs MJ, Elenbass TW, Schurink GWH, Mess WH, Mochtar B. Assessment of spinal cord integrity during thoracoabdominal aortic aneurysm repair. *Ann Thorac Surg* 2000;74:S1864–S1866.
17. Langeloo DD, Lelivelt A, Journee L, Slappendel R, de Kleuver M. Transcranial electrical motor-evoked potential monitoring during surgery for spinal deformity: a study of 145 patients. *Spine* 2003;28:1043–1050.
18. Khan MH, Smith PN, Balzer JB, et al. Intraoperative somatosensory evoked potential monitoring during cervical spine corpectomy surgery: experience with 508 cases. *Spine* 2006;31:E105–E113.
19. Coles JG, Wilson GJ, Sima AF, Klement P, Tait GA. Intraoperative detection of spinal cord ischemia using somatosensory cortical evoked potentials during thoracic aortic occlusion. *Ann Thorac Surg* 1982;34:299–306.
20. Kojima Y, Yamamoto T, Ogino H, Okada K, Ono K. Evoked spinal potentials as a monitor of spinal cord viability. *Spine* 1979;4:471–477.
21. Laschinger JC, Cunningham JN Jr, Carinella FP, Nathan IM, Knopp EA, Spencer FC. Detection and prevention of intraoperative spinal cord ischemia after cross-clamping of the thoracic aorta: use of somatosensory evoked potentials. *Surgery* 1982;92:1109–1117.
22. Cheng MK, Robertson C, Grossman RG, Foltz R, Williams V. Neurological outcome correlated with spinal evoked potentials in a spinal cord ischemia model. *J Neurosurg* 1984;60:786–795.
23. Nordwall A, Axelgaard J, Harada Y, Valencia P, McNeal DR, Brown JC. Spinal cord monitoring using evoked potentials recorded from feline vertebral bone. *Spine* 1979;4:486–494.
24. Bennett MH. Effects of compression and ischemia on spinal cord evoked potentials. *Exp Neurol* 1983;80:508–519.
25. American Medical Association. Diagnosis of disease and diagnostic interpretation of tests constitutes practice of medicine to be performed by or under the supervision of licensed physicians. Policy H-35.971. Adopted December 2006. Available at: <https://ssl3.ama-assn.org/apps/ecom/policyfinderform.pl?site=www.ama-assn.org&uri=%2fresources%2fdoc%2fpolicyfinder%2fpolicyfiles%2fInE%2fH-35.971.HTM>. Accessed February 1, 2010.
26. American Medical Association. Intraoperative neurophysiologic monitoring. Policy H-410.957. Adopted June 2008. <https://ssl3.ama-assn.org/apps/ecom/policyfinderform.pl?site=www.ama-assn.org&uri=%2fresources%2fdoc%2fpolicyfinder%2fpolicyfiles%2fInE%2fH-410.957.HTM>. Accessed February 1, 2010.

Endorsed by the American Association of Neuromuscular and Electrodiagnostic Medicine on January 3, 2012.